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Bibliography on High Level Winds (above 100 mb)

l. 4 June, 1953 No. 6

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 4 JUNE, 1953 No. 6

SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on High Level Winds (above 100 mb)

(*For complete table of contents see back cover*)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to ing to the attention of meteorologists current literature in their field and in related fields and provide bibliographic information on various subjects, as interest demands.

Part I contains from 175 to 300 abstracts of current periodical literature and monographs in e fields of meteorology, hydrology, oceanography, etc. These abstracts are arranged cording to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of from 50 to 250 im- rtant references on a special subject without respect to recency of material. No attempt made to prepare exhaustive bibliographies; instead, the aim is to include a representative oss section of the various aspects of a subject. Preference is given to recent material, mprehensive works, material from obscure sources, and items with good bibliographies.

Bibliographies previously published were:

o. Mo.	Vol. I, 1950	Vol. II, 1951	Vol. III, 1952
. Jan.	**Atmospheric Pollution**	**Extended Forecasting**	**Climate—Northwest Africa**
. Feb.	**Aerobiology**	**Long Range Forecasting**	**Carbon Dioxide**
. March	**Cloud Physics**	**Soil Temperature**	**Climate—Paraguay, Uruguay, Argentina**
. April	**Hail**	**Constants, Tables, Diagrams**	**Dew**
. May	**Tornadoes**	**Climate—Near East**	**Objective Forecasting**
. June	**Volcanic Dust**	**Climate—Middle East**	**Stratus Forecasting**
. July	**Climatic Changes**	**Special Winds**	**Urban Climatology**
. Aug.	**Thunderstorms**	**Radar Storm Detection**	**Climate—Central Africa**
. Sept.	**Icing**	**Condensation Trails**	**Visibility**
. Oct.	**Acoustical Propagation**	**Climate—Northeast Africa**	**Glaze and Rime**
. Nov.	**Evaporation**	**Mountain Meteorology**	**Free Air Turbulence**

Bibliographies published this year are:

1. **Turbulence Theory,** Vol. IV, No. 1, Jan. 1953
2. **Turbulent Diffusion and Exchange,** Vol. IV, No. 2, Feb. 1953
3. **Frost and Frost Forecasting,** Vol. IV, No. 3, March 1953
4. **Climate of Australia and New Zealand,** Vol. IV, No. 4, April 1953
5. **High Level Winds (500–100 mb),** Vol. IV, No. 5, May 1953
6. **High Level Winds (above 100 mb),** Vol. IV, No. 6, June 1953

Forthcoming bibliographies will be:

7. **Jet Stream,** Vol. IV, No. 7, July 1953
8. **Radiation Bioclimatology,** Vol. IV, No. 8, Aug. 1953
9. **Meteorology and Oceanography of the Pacific,** Vol. IV, No. 9, Sept. 1953

Other bibliographies in preparation are:

Actinometers
Arctic Meteorology
Auroral Physics
Climate of Southeast Asia and the East Indies
Machine Methods in Meteorology
Microwave Propagation
Oceanographic Meteorology
Ozone
Sferics
Snow Cover
Tropical Cyclones
Tropopause Variations

Part III contains a listing of the contents of those journals which are primarily meteoro- ical. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the December issue nulative author, subject, geographical and journal indexes are published.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where th material may be found. The Union List of Serials (Gregory) is the source of most of th symbols used. In some cases, where no symbol has been assigned to a library, one will b devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory (and American Meteorologica Society) Library, Milton, Mass.
NN:	New York Public Library, New York, N. Y.
NNA:	American Geographical Society Library, New York, N. Y.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwis stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to th Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months ar abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Numbe (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus a entry will read as follows:

Meteorologische Rundschau, 2(5–6):146–151, May–June 1950.

This indicates that the article appeared in *Meteorologische Rundschau, Jahrgang* 2 (Vo 2), *Heft* 5–6 (No. 5 and 6), *pages* 146–151, May–June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

)MPENDIUM ARTICLES AND WORKS OF SPECIAL INTEREST

4.6–1 551.582.3(569.4)

*Ashbel, Dov (*Dir. Met. Lab. Hebrew Univ.*), **Bio-climatic atlas of Israel.** Jerusalem, teorological Dept. of the Hebrew University [1950]. 151 p. 315 figs. In English and brew. **DWB**—A comprehensive discussion of the climate and the individual meteorological iables of Israel supplemented by extensive diagrams, graphs and maps. The chapters er barometric pressure, wind direction and speed, rain, dew, relative humidity and evap- tion, solar radiation (includes radiation on horizontal surface, on walls at different hours, ly amount of radiation on walls, radiation on slopes, etc.), water and soil temperatures, air nperature, the Khamsin and temperature and humidity in the Middle East. The climatic racteristics of particular areas and localities in Israel are discussed. All the discussion and a are oriented bioclimatically. *Subject Headings:* **1. Climatic atlases 2. Bioclimatology Solar radiation 4. Climate of Israel 5. Israel.**—*I.L.D.*

4.6–2 551.5:519.2

Brooks, C. E. P. and Curruthers, N., **Handbook of statistical methods in meteorology.** ndon, H.M. Stationary Office, **1953.** 413 p. 75 figs., tables, refs., eqs. At head of title: 0538. **DWB**—This book sets out formulas, methods and examples of the application of dern statistical ideas to meteorological data. Pt. I, The distribution of observations, deals h "observations" as individual phenomena, their nature and errors, probability, one-dimen- nal frequency distributions, mean values, standard deviation, skewness, kurtosis, and nificance tests. The properties of various types of distribution—binomal, normal, Pearson ves etc.—are summarized. A chapter is included on the analysis of variance. Pt. II, lated variables, discusses space distributions, vector quantities, correlation, smoothing, erpolation and curve fitting. Pt. III, Time series, includes persistence, harmonic analysis, l an examination of various methods of periodogram analysis. Appendices give useful tistical formulas and tables. Nearly all the examples and exercises are taken from meteor- gy. *Subject Headings:* **1. Statistical analysis. I. Great Britain. Meteorological Office.**— *.P.B.*

4.6–3 551.510.535:06

Conference on Ionospheric Physics, Pennsylvania State College, July 1951, **Proceedings, . A and B.** *U. S. Air Force. Cambridge Research Center. Geophysical Research Papers,* s. 11 and 12, April **1952.** graphs, diagrs., eqs., bibliogs. **DWB**—These Proceedings were o issued earlier, in Dec. 1950, by the Pennsylvania State College and GRD under the editor- p of C. H. GRACE, in a 1 v. ed. A few of the papers have titles different from those that peared in the preliminary edition, but except for editing and remarks, the 19 papers are the ne in the two editions and represent the lectures given by world famous specialists on blems of the ionosphere, aurora, mesosphere, chemosphere and exosphere. *Subject Head- s:* **1. Ionospheric physics 2. Upper atmosphere 3. Conferences. I. Gerson, N. S.** (*ed.*) **Donaldson, Ralph J., Jr.** (*ed.*) **III. Katz, Ludwig** (*ed.*) **IV. Grace, Clinton H.** (*ed.*) **V. U. S. Force. Cambridge Research Center VI. Pennsylvania. State College.**—*M.R.*

4.6–4 551.5:014(05)

†Dieterichs, Heinz, **Gesamtregister der Beiträge zur Physik der freien Atmosphäre. (Bd. 8 mit Bei- und Sonderheften.)** [Complete index to Beiträge zur Physik der freien At- sphäre, v. 1–28, including supplements and separate numbers.] *Germany. Deutsche*

Demokratische Republik. Meteorologischer Dienst, Veröffentlichungen, No. 4, **1951.** 48
DWB—A cumulative author, title and subject index of all 28 volumes (and supplement
of this outstanding series published between 1904 and 1945. Nearly every important m
teorologist who published during these years is represented in this index. The subject index
presented in two ways: 1) a dictionary-type list of about 600 subjects arranged alphabetical
(in German) and 2) a classified subject index arranged by the 50 major headings of the U.D.C
system, with some subdivision. *Subject Headings:* **1. Cumulative indexes 2. Bibliographie
3. Serials 4. U.D.C. catalogs 5. Beiträge zur Physik der freien Atmosphäre.**—*M.R.*

4.6–5 551.510.4:523
Hess, S. L. and Panofsky, H. A., **The atmospheres of the other planets.** (In: **Compendiu
of meteorology.** Boston, American Meteorological Society, **1951.** p. 391–398. 3 figs
2 tables, 11 refs.) **MH-BH**—Our knowledge on atmosphere of Venus, Mars and the majo
planets is summarized. A table of the meteorological parameters, of the probable atmospher
constituents, the values of adiabatic lapse rates and of the pressure and temperature of th
"visible" surface is given. Venus is probably covered by lower dust clouds and higher clouds o
condensed CO_2 with a high albedo (0.59). No oxygen or water vapor exists. Mars has th
smallest albedo of all planets (0.15). The horizontal distribution of temperature and winds o
Mars is shown on charts. The atmospheric circulation is very similar to the earth's. The onl
constituents of the major planets identified spectroscopically in their atmospheres are methan
and ammonia, but hydrogen and helium should also exist in large amounts. The surfac
temperature of Jupiter is found to be 150°K, probably owing to an appreciable greenhous
effect. The distribution of spot periods on Jupiter with latitude is shown. A correlation o
0.60 is found between the speed of the Red Spot on the Jupiter and the speed of the surfac
westerlies on earth. Relatively little is known on the atmospheres of the other major planets
Subject Headings: **1. Planetary atmospheres 2. Compendium articles.**—*A.A.*

4.6–6 551.510.41:523.
Kuiper, Gerard Peter (*ed.*), **The atmospheres of the earth and planets.** Rev. ed. Chicago
University of Chicago Press, **1952.** 434 p. 93 figs., tables, 16 plates, refs., bibliog., eqs
DWB—In revising the outstanding collection of articles on planetary atmospheres which wa
published in 1949 (*see item* 10–4, Oct. 1950, *MAB*), considerable new material has been include
in several of the chapters. The contributions by Rossby (*see item* 10–65, Oct. 1950, *MAB*)
van de Hulst (*item* 10–89), and Spitzer (*item* 11–53, Nov., 1950) have not been changed
The greatest change is in Swings' article on the "Spectra of the night sky and Aurora" (*item*
10–186), which is revised by Meinel and Swings; and the article by Kuiper on "Origin o
planetary atmospheres" which is completely rewritten and doubled in length (abstracte
separately). The article by Franck on "Photosynthesis on Mars" has been deleted and
longer treatise based on recent evidence, added to the original article by Kuiper mentione
above. In this chapter Kuiper refutes the opinion of Franck that the green color on Mar
is due to the colors of minerals which change with the seasons, and holds to the earlier vie
that photosynthesis is probable. At the end of the work there are several appendices: on
by Kuiper gives a new profile of the upper atmosphere (to 300 km) based on recent rocke
data. There are also addenda to the chapters by Greenstein (on rocket research) wherei
evidence of the current system in the E region supports the dynamo theory, and to Chap. 1
by Kuiper which brings it up to date. *Subject Headings:* **1. Planetary atmospheres 2. Uppe
air observations 3. Rocket research. I. Chicago. University. Committee on Publication
in the Physical Sciences.**—*M.R.*

4.6–7 551.579:01
†Linsley, Ray K. (*ed.*), **Annotated bibliography on hydrology, 1941–1950, United State
and Canada.** *U. S. Federal Inter-Agency River Basin Committee, Notes on Hydrologic Activitie*
No. 5, June **1952.** 408 p. **DWB**—Annual hydrological bibliographies were published by th
American Geophysical Union in accordance with standards set up by the I.U.G.G.—Inter
national Association of Scientific Hydrology, for the years 1936 through 1940. Other countrie
published similar bibliographies. This volume covers the period from 1941–1950, when th
standard publication was interrupted by the war. The entries are arranged by author, and

ject index (p. 364–408) refers to general subject or area (none smaller than a state or river in), to specific subject and to author of paper. Many of the references are annotated efly. Four thousand five hundred works appearing in 400 United States and Canadian rnals and covering a broad area of hydrology and meteorology are listed. *Subject Headings:* **Hydrologic bibliographies 2. United States 3. Canada. I. U. S. Federal Inter-Agency er Basin Committee II. American Geophysical Union III. National Research Council, shington, D. C.**—*M.R.*

4.6–8 551.579 551.509.5

Linsley, Ray K. (*U. S. Weather Bur., Wash., D. C.*), **The hydrologic cycle and its relation meteorology—river forecasting.** (In: **Compendium of meteorology.** Boston, American teorological Society, **1951.** p. 1048–1054. 4 figs., 16 refs.) **MH-BH**—The first section, ich deals with the hydrometeorological cycle and its relation to meteorology, consists of a cription of the various fields of hydrology, namely: potamology, limnology, cryology and hydrology, and a review of the more important problems in surface water hydrology for solution of which meteorology can provide data. The latter involves the evaluation of precipitation regime over an area, the determination of evaporation, snow melt and the ign of structures to control the flow of water. In the section on river forecasting, the hor discusses: 1) the organization of a river forecasting service, 2) flood routing, 3) forecast- of runoff from rainfall, 4) forecasting of snow melt, 5) forecasting of water supply and the importance of weather forecasts in river forecasting. *Subject Headings:* **1. Hydrologic le 2. Hydrology 3. Hydrologic forecasting 4. Compendium articles.**—*I.L.D.*

4.6–9 551.513:551.552:551.557.2

*Mintz, Yale and Dean, Gordon, **The observed mean field of motion of the atmosphere.** *S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 17, Aug. **1952.** p. 47 figs., bibliog. p. 62–63. **DWB**—A useful collection of maps and graphs for July and ı., based on observational results without theoretical assumptions. Streamlines of the an surface wind (ocean and continents) are chiefly based on the mean vector wind. Isolines mean wind velocity are given for the oceans only. The constancy of the surface wind ection and the mean divergence and vorticity of the surface wind are calculated and shown on ps. Mean sea level pressure maps, based on the old edition of the "Normal Weather Maps" . S. Weather Bureau, 1946), are compiled for the Northern Hemisphere and several new ırces south of 10°N. The meridional pressure profile is calculated for the whole earth and eans only. The discrepancy between different investigations regarding the pressure dis- ɔution in the Arctic is shown. The mean wind duration, constancy and speed is given for 500 mb surface, the mean kinetic energy calculated and meridional cross sections of the an zonal wind presented along 100°E (N), 170°E (S) and 80°W (N). *Subject Headings:* **Atmospheric circulation 2. Wind distribution 3. Pressure distribution 4. Northern emisphere 5. Southern Hemisphere.**—*A.A.*

4.6–10 5:06

Pacific Science Association. Secretariat, **Report on the Pacific Science Association.** *rnice B. Bishop Museum, Honolulu, Special Publication*, No. 41, **1951.** 115 p. **DWB**—ter a complete report on the Pacific Science Association, its history, member countries and titutions, constitution of the Eighth Pacific Science Congress, and the internal committees the Association, resolutions in various fields of science are listed and explained. Those on teorology are found on p. 78–80, oceanography p. 80–89, geophysics (aside from meteorology d oceanography) p. 71–78, and on agriculture, forestry, soils, geology, conservation and ıer fields. The next meeting of the Pacific Science Congress will be in Manila, Philippine ands in 1953. *Subject Headings:* **1. Pacific Science Association 2. Pacific Science Congress Conventions 4. Pacific Ocean area.**—*M.R.*

4.6–11 551.574.7

Rodert, Lewis A. (*NACA*), **Physical and operational aspects of aircraft icing.** (In: **mpendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 1190–96. 2 figs., 17 refs.) **MH-BH**—"An analysis of the physical phenomena of ice formation

on vulnerable components of the airplane under various atmospheric conditions during su sonic flight conditions at altitudes below the tropopause." The author considers the ph nomenon of the natural existence of liquid water in the atmosphere near the airplane and t thermodynamic and aerodynamic conditions associated with its formation; the analysis droplet impingement upon a moving airplane surface and its explanation which "are ma for the hypothetical condition in which air passes over a stationary airfoil"; the environmen temperature of the supercooled droplets striking the solid boundary and the thermal process involved in the passage from the liquid to the solid phase. The conditions forming and hinde ing ice formations are outlined. Special case of ice formation present when an airplane mov from a very high to a lower altitude, and the formation of frost on airplanes as a result radiational heat loss are discussed. A brief discussion of the effect of ice formations up the airplane components, namely: wing and control surfaces, propeller blades, engine inducti systems, windshield, Pitot-static head, vents and air inlets, etc. is presented. The suggestio for further research so as to facilitate thermal ice prevention involve heat-transfer relationsh of the airfoil, the study of icing conditions at altitudes above 25,000 ft, geographic variation icing conditions, physics of icing cloud stability, icing forecasts and development of instrumen for collecting atmospheric data on icing. (*Same item as* I–174, Sept. 1950, *MAB.*) *Subj Headings:* **1. Icing of aircraft 2. Impingement of drops 3. Ice formation 4. Compendiu articles.**—*I.L.D.*

4.6–12 551.509(0

§Schwerdtfeger, Werner (*Argentine Nat. Met. Ser.*), **El problema de la previsión del tiemp** [The problem of weather forecasting.] Buenos Aires, Ediciones Librería del Colegio, 195 145 p. 15 figs., 13 tables, refs. Price: $18—m/arg. **DWB**—The present text is the mo modern and systematic work on synoptic and statistical forecasting in the Spanish languag It was modeled after SCHMAUS's classical work of 1925 and 1937—"Das Problem der Wette vorhersage," but contains many ideas developed between 1937 and 1950 and special applic tions to conditions in South America. The style is simple and nontechnical but the bas ideas are sound. The 14 chapters cover the following subjects: 1) the concepts of weathe air masses and forecasting, 2) primitive ideas of weather and forecasting, 3) weather signs a popular rules-of-thumb, 4) the effect of the moon, 5) synoptic observations and analysis, front weather maps, 6) pressure and wind, 7) frontal weather, 8) short range synoptic forecastin 9) errors in forecasts, 10) verification of forecasts, 11) statistical methods of forecastin 12) medium range forecasting, 13) long range forecasting and 14) causes of weather occurrence *Subject Headings:* **1. Weather forecasting 2. Synoptic analysis 3. Textbooks 4. Weath lore 5. Long range forecasting 6. South America.**—*M.R.*

4.6–13 551.5:016(9

†U. S. Bureau of Aeronautics (Navy), **Antarctic bibliography.** Prepared by the U. Naval Photographic Interpretation Center. Washington D. C., U. S. Govt. Print. Of Feb. 1, 1951. 147 p. *U. S. Office of Naval Operations, NAVAER,* 10–35–591. Price: $1.2 **DWB**—For the benefit of military and naval research analysts, geographers, explorers a scientists interested in the problems of the Antarctic, a bibliography of 5500 items has be prepared by the Office of Naval Research. Some of the items are annotated and an auth index is attached. The material is arranged according to general heads (Biological, Ge physical and Geographical Science, individual Geographical Explorations, and Miscellaneous Under these heads the 38 subtopics are distributed. The section on Meteorology and Clim tology occupies 10 pages and contains about 400 references, a section on Aurora Australi 60 references, Oceanography, 172; Ice, 250, etc. References are listed chronologically in ea section. *Subject Headings:* **1. Antarctic bibliographies 2. Aurora australis 3. Oceanograph bibliographies. I. U. S. Naval Photographic Interpretation Center.**—*M.R.*

4.6–14 551.501.81:551.594

Wexler, Raymond (*Imperial Col. of Sc. and Tech.*), **Theory of observation of radar stor detection.** (In: **Compendium of meteorology.** Boston, American Meteorological Societ **1951.** p. 1283–1289. 4 figs., 2 tables, 16 refs., 6 eqs.) **MH-BH**—The basic theory of rad storm detection together with the equations for detecting particles of scattering by electr

nagnetic energy propagated isotropically from their source and the equation for storm detection ncluding the effect of attenuation are presented. The refraction of radio waves in the at- nosphere, the range-height relationship for refraction; attenuation of microwaves by absorption f oxygen and water vapor and by absorption of scattering from cloud and precipitation; the ertical structure of precipitation as revealed by radar studies, the bright band observed on the adar scope, Ryd's explanations of this phenomenon, the presence of an upper band in the right band reported by Bowen; and the horizontal structure of precipitation as indicated by ne PPI scope are discussed. Research problems such as the relationship between the rate of se of the visual top and echo top in growing thunderstorms, coagulation and chain reaction ffects on heavy rain and characteristics of precipitation echoes during formation of the bright and are suggested. *Subject Headings:* **1. Radar storm detection 2. Radar propagation . Radar echoes 4. Compendium articles.**—*I.L.D.*

GENERAL METEOROLOGY

See also: **Handbook of statistical methods in meteorology** (Brooks and Carruthers), 4.6–2; **Index to Beiträge zur Physik der freien Atmosphäre** (Dieterichs), 4.6–4; **Antarctic bibliog.** (U. S. Bureau of Aeronautics), 4.6–13.

4.6–15 551.5(02)

Hood, Peter Conrad Hayley, **The atmosphere.** London, Oxford University Press, 1952. 4 p. illus., bibliog. p. 64. *Oxford Visual Series.* **DLC** –An elementary and well-illustrated ext on meteorology for Junior High School students (11–15 years), with chapters on the tmosphere, clouds, rain, thunderstorms, hail, lightning, frost, snow, fog, winds, tornadoes, ressure changes, the weather map, cyclones, forecasts, British weather and climate, optical henomena and recording temperature, wind, clouds, rain, etc. A list of books for further eading also includes comments on the contents of some quite advanced British works of ecent years. In fact, the excellent illustrations and the modern approach are at the teachers ollege level although the brevity of the chapters keeps the work in the secondary school ategory. *Subject Headings:* **1. Elementary meteorology 2. Textbooks.**—*M.R.*

4.6–16 551.5(04)

Miller, Denning Duer, **Wind, storm and rain, the story of weather.** New York, Coward-IcMann, c1952. 177 p. 8 plates, diagrs., charts. **DWB**—A popular book describing, in a ystematic but not in a textbook fashion, the processes and elements of the weather such as the onstitution of the atmosphere, general circulation, local circulation and storms, air masses, ronts, clouds, wind pressure, jet stream, hurricanes, weather maps and forecasting the weather. simple glossary is provided. A few simple illustrations, synoptic charts and cloud pictures re included. Throughout the book and in the glossary Coriolis is spelled Coriolus. *Subject leading:* **1. Popular meteorology.**—*M.R.*

4.6–17 551.5(05)

Mendoza, Argentina. Universidad Nacional de Cuyo. Departamento de Investigaciones ientíficas, **Anales,** Tomo I, Cuaderno 1, 1952. [Annals, v. I, No. 1, 1952.] Pub. by the niversity, 1952–. 98 p. illus. In Spanish; summaries in Spanish and German. "The nales propose to publicize the scientific efforts of the Department, and the progress of its ivestigations." **DWB**—In this first issue of a new scientific periodical, two excellent articles the field of meteorology (aerology) are presented—one by WALTER GEORGII and one by ANS W. GEORGII. It is not likely that each issue will be 99% devoted to meteorology, ut this is a good beginning. *Subject Headings:* **1. Periodicals 2. Meteorological literature. Georgii, Walter II. Georgii, Hans W.**—*M.R.*

4.6–18 551.5(09)

Dempsey, P. J. R., **Science in Ireland.** *Science,* 115(2998):635–636, June 13, 1952. ible, 17 refs. **DWB**—A brief account of some of the research in the physical and biological iences and in statistics that is being carried on in Ireland and a list of some of the more nportant investigations. In the school of cosmic physics directed by L. W. POLLAK,

research is being conducted on long period fluctuations of the frequency of cyclones over th Atlantic, on the possibility of seasonal forecasting of yield and sugar content of beets in Wate ford and on the relationship of nuclei and meteorological elements in Dublin. *Subject Heading* **1. Progress in meteorology 2. Ireland.**—*I.L.D.*

4.6–19 551.5(09) 551.5:9

Keil, Karl, **Die Meteorologie im Speculum majus des Vincenz von Beauvais.** [Meteo ology in the "Speculum majus" of V. von Beauvais.] *Germany. Deutscher Wetterdienst in d US-Zone, Berichte,* No. 38:373-376, **1952.** 9 refs. **DWB**—V. VON BEAUVAIS, a Dominica Friar who died ca 1246 A.D., compiled a 3 volume encyclopedia. Book 5 includes a complet meteorological treatise, and Book 16 some additional speculations. A list of 32 authors quote is added, with brief biographical details. *Subject Headings:* **1. History of meteorology 2. vo Beauvais, Vincenz.**—*C.E.P.B.*

4.6–20 551.5(261,74):629.12 551.582(261,74

*U. S. Coast and Geodetic Survey, **United States coast pilot. Atlantic Coast, Section E Cape Cod to Sandy Hook.** 5th (1950) ed. Wash., D. C., Govt. Print. Off., **1950.** 503 p diagrs., tables, charts. *U. S. Dept. of Commerce. Coast and Geodetic Survey, Serial* No. 73(April 1, **1950.** In pocket: **Supplement, Jan. 1, 1951.** Serial No. 736-1. Price $1.50. **DWB**– Describes forecast and warning service of U. S. Weather Bureau, marine climatological service information services for transoceanic air transport, storm signals, broadcasts by U. S. Coas Guard, reports from ships, publications, and work of many other bureaus affecting shipping A section on "Weather and climate" (p. 44–66) contains several charts and tables showin pressure, air and water temperature for Jan., Apr., July and Oct. along the Atlantic coast an in the Gulf of Mexico and Caribbean, a list of hurricanes since 1900, and a great deal of in formation on winds, fog, thunderstorms, cloud and hurricanes. The last subject is treated i special detail. Complete meteorological tables are appended for 10 stations along the Atlanti coast. *Subject Headings:* **1. Marine meteorology 2. Marine climatology 3. Marine fore casting 4. Atlantic Coast of United States. I. U. S. Weather Bureau.**—*M.R.*

4.6–21 551.5:016(09)(52

†Shoono, Shigekata and Watanabe, Tsugio, **Kishō rikigaku shimpo no gaikan.** [Reviev of the progress in meteorological dynamics.] *Meteorological Society of Japan, Journal, 2n Ser.,* 28(8):1–54, Aug. **1950.** figs., 216 refs. eqs. In Japanese. **DWB** –Methods used an progress achieved by Japanese investigators from 1940 to 1945 are reviewed. Theoretica results are thoroughly discussed and supported by mathematical deductions and reference t non-Japanese authors. The papers quoted and reviewed cover the fields of general atmospheri dynamics, atmospheric stability, pressure fluctuations, fronts, depressions, anticyclones pressure waves, vorticity, thunderstorms, etc. A bibliography of 149 papers published i Japan during the period 1940–1944 (2 papers for 1945) is attached. Author, title, source, an subject references are indicated for each item listed. *Subject Headings:* **1. Progress in meteor ology 2. Bibliographies 3. Japan.**—*G.T.*

4.6–22 551.5:0

Centro Nacional de Investigaciones de Cafe, Chinchina, Colombia. Biblioteca, **Boletí Informativo.** Chinchina, Colombia, Federación Nacional de Cafeteros. Monthly. Las issue received v. 4, No. 37, Jan. **1953. DWB** –A regular feature in this monthly bulletin of th research center of the federation of coffee growers in Colombia is a section entitled Servici Meteorológico, which gives daily values of meteorological and micrometeorological element obtained at the research center's own observation station. The section includes comments o the data presented. A graphical summary of the monthly development of meteorologica elements at Chinchina (Caldas, Colombia) is attached. The bulletin also includes reviews o ecological literature and reports on ecological studies and courses conducted at the researc center. *Subject Headings:* **1. Meteorological services 2. Micrometeorology 3. Coffe 4. Chinchina, Colombia. I. Federacion Nacional de Cafeteros, Chinchina, Colombia.**—*G.T.*

4.6–23 551.5:06

Defrise, Pierre, **Le progrès en météorologie.** [Progress in meteorology.] *Ciel et Terre,* Vo. 5/6:130–133, May/June **1952. MH-BH**—A short account of the Conference of the Société elge d'Astronomie, de Météorologie et de Physique du Globe in March 1952. Gives prin-pal explanations of modern terms and methods in meteorology for nonspecialists. *Subject leadings:* **1. Meteorology 2. Conferences.**—*A.A.*

4.6–24 551.5:06

U. S. Weather Bureau, **Budget digest, 1952–1953.** [Washington, D. C. Pub. by the Dept. f Commerce, **1952.**] 117+p. tables, diagrs. **DWB**—A graphical, statistical and descriptive urvey of the organization, activities, services and expenses of the U. S. Weather Bureau during he past 10 years, an estimate of expenses for 1953, and a brief history of the Weather Service nce 1870 when it was inaugurated under the U. S. Signal Corps. The location of all types of ations: upper air wind, radiosonde, first order synoptic, solar radiation, etc.; the districts overed by fire weather, climatological, fruit frost, aviation and administrative offices; location f ocean weather ships in the Atlantic and Pacific; and the Arctic weather stations are all shown n individual charts. *Subject Headings:* **1. Meteorological services 2. Meteorological net-orks 3. History of the U. S. Weather Bureau 4. U. S. Weather Bureau.**—*M.R.*

4.6–25 551.5:06

You and the weather. Boston, American Meteorological Society **[1952].** 1 leaf, folded thirds. illus. **MH-BH**—Those interested in the activities of the American Meteorological ociety will find this sheet provides useful information regarding the society's publications, mployment services, guidance in education, library facilities and meetings and committees, s well as listing the qualifications for membership. *Subject Headings:* **1. American Meteoro-gical Society 2. Opportunities in meteorology.**—*G.T.*

4.6–26 551.5:06(438)

Z dzialalnosci Polskiego Towarzystwa Meteorologicznego i Hydrologicznego. [On the ctivity of the Polish Meteorological and Hydrological Society.] *Przegląd Meteorologiczny i Hydrologiczny,* 1950/1951:241–249, **1951. DWB**—Reports from recent meetings of the ociety contain an interesting summary of W. Parozewski's report on meteorological condi-ons during his 1950 glider flight, which established the international record of 8162 m, reviously held by the Americans Ross and Deibert (7407 m). The Polish pilot was ndrew Brzuska. Also reports on the society's new officers, library, budget, etc., and states hat the work on meteorological terminology, conducted up to now by the Sekcja Słownictwa leteorologicznego (Section of Meteorological Terminology), is being continued by the Pod-omisja Meteorologii Lotniczej Polskiego Komitetu Normalizacyjnego (Airforce Meteorology ubcommission of the Polish Committee for Normalization). *Subject Headings:* **1. Meteoro-gical organizations 2. Conferences 3. Polish Meteorological and Hydrological Society Poland.**—*W. Tomczykowski.*

4.6–27 551.5:37:91

Szász, Gábor, **A szinoptika tanításának kérdése geográfiai szempontból.** [The problem f synoptic teaching from the geographic point of view.] *Időjárás,* 56(5/6):155–156, May/une **1952.** ref. **DWB**—Review of S. P. Khromov's "Sinopticheskaia meteorologiia kak eograficheskaia nauka" published in *Vsesoiuznoe Geograficheskoe Obshchestvo, Izvestiia,* Vol. 1, No. 5, 1949, p. 528–530. The close relationship between synoptic meteorology and eography is discussed. It is unreasonable to say that geographers are satisfied to deal with imatology only. Climate cannot be properly understood without a knowledge of synoptic henomena. It is therefore imperative that in addition to climatology, geographers also ake up the study of synoptic meteorology. *Subject Headings:* **1. Geographical climatology Synoptic meteorology 3. Teaching of geography.**—*G.T.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Handbook of statistical methods in meteorology** (Brooks and Carruthers), 4.6–2; **Radar storm detection** (Wexler), 4.6–14; **Radar observation of Benard cells** (Foster), 4.6–169; **Snow survey, Great Britain** (Hawke, Bonacina), 4.6–182; **Psychophysical methods to measure visual thresholds** (Blackwell), 4.6–232; **Psychophysical basis of meteorological estimates of visibility** (Middelton, Mungall), 4.6–233.

4.6–28 551.501:06(497.1

Obuljen, A., **O problemima sinoptičke meteorologije na području FNR Jugoslavije** [Problems of synoptic meteorology in Yugoslavia.] *Yugoslavia. Hidrometeorološka Služba Hindrometeorološki Glasnik*, 1(1):50–53, Aug. **1948.** In Croatian. **DWB**—It is pointed out that synoptic elements and dynamic phenomena over Yugoslavia are among the most complex in Europe. The lack in coordination of meteorological services is considered to have been the main obstacle in the way of efficiency in the past. It is hoped that the reorganization of the hydrometeorological service will remedy this situation. Resolutions passed by a conference held in April 1948 under the chairmanship of the director of the Hydrometeorological Service of Yugoslavia are discussed. They provide for practical, theoretical and technical projects in synoptic meteorology in conjunction with the 5-year plan. *Subject Headings:* **1. Meteorological services 2. Synoptic meteorology 3. Hydrometeorological services 4. Yugoslavia**—*G.T.*

4.6–29 551.501.1(02

Berényi, Dénes, **Útmutatás a meteorológiai megfigyelésekre.** [Instructions for meteorological observation.] *Időjárás*, 56(5/6):188–189, May/June **1952. DWB**—Review of the third, enlarged edition of the Hungarian Meteorological Institute's official "Instructions." The first edition was issued in 1941, the second in 1945. In the new edition, additions were made to the section containing instructions for the observation of rainfall, and instructions for observation of soil condition have been included. The manual is based on international standards with some modifications on account of peculiar conditions in Hungary. *Subject Headings* **1. Instruction for observers 2. Observers manuals.**—*G.T.*

4.6–30 551.501.1(26

Philpott, L. B., **A new logbook.** *Marine Observer*, 23(159):14–18, Jan. **1953.** 5 figs. **MH-BH**—After a brief history of marine meteorological observing, a new arrangement of the meteorological log book for British selected ships is illustrated and described. This is combined with record of coded messages and follows sequence of new Hollerith card. *Subject Headings* **1. Marine meteorological observation 2. Punch card forms 3. Marine punched cards.**—*C.E.P.B.*

4.6–31 551.501.4

*Netherlands. (K.) Meteorological Institut, **Barometercorrectie-, Herleidings-en Psychrometer-Tabellen, ten gebruiki bij het Meteorologisch journaal.** [Barometric correction, conversion and psychrometer tables for use in meteorological records.] *Netherlands. (K.) Meteorologisch Institut, [Uitgave]* No. 130, **1948.** 18 p. mostly tables. In Dutch. Price Fl. 0.40. **DLC**—Contains seven detailed working tables: 1) correction (for ships barometers) for temperature of scale thermometer, 2) correction for height above sea, 3) for latitude, 4) conversion from mm to mb, 5) for inches to mb, 6) for °F to °C, and 7) for dew point and relative humidity from dry bulb and difference between dry and wet bulb (to 0.2 C intervals). Both dew point and relative humidity values are given in the same column. *Subject Headings* **1. Correction tables 2. Conversion tables 3. Dew point—relative humidity tables.**—*M.R.*

4.6–32 551.501.4:551.593:527(059)

Sadler, D. H. (*Supt. H. M. Nautical Almanac Office*), **The refraction table in the Almanac.** *Institute of Navigation, London, Journal*, 5(3):223–234, July **1952.** 3 figs., 2 tables, 6 refs. 20 eqs. **DLC**—The new refraction table printed on the inside back cover of H. M. Nautical

Almanac Office's Air Almanac is reproduced, its use explained and the methods applied in preparing it discussed. The table gives values of refraction correction up to an altitude of 35,000 ft. In an appendix the theory of the numerical integration of a first-order differential equation is analyzed in conjunction with its application to refraction. The Air Almanac will become a single publication with the American Air Almanac from 1953 on. *Subject Headings:* **1. Refraction correction tables 2. Almanacs 3. Great Britain.**—*G.T.*

4.6–33 551.501.7 551.509.317

Great Britain. Naval Weather Service, **Notes on upper air charts.** *Great Britain. Naval Weather Service, Memo.* No. 148/52, **1952.** 32 p. 23 figs., 5 tables. Mimeographed. **DWB**—This useful working guide summarizes the information presented by upper air charts and their application in forecasting. The first part deals with calculation of wind from contour charts, thickness charts, etc. Then follows a review of the ideas involved in mathematical forecasting; divergence and convergence, shear and a simple account of vorticity. The application of thickness charts to forecasting includes the development at the surface in terms of thermal wind and divergence, example of different thickness patterns, formations of secondary depressions at points of occlusion, waves on cold fronts, anticyclones, warm sector depressions, etc. *Subject Heading:* **1. Upper air analysis.**—*C.E.P.B.*

4.6–34 551.501.9:523.7(54)

†*India. Meteorological Dept., **Kodaikanal Observatory, 1901–1951.** New Delhi, Pub. by the Govt., **1951.** 44 p. ports. (of directors), photos., bibliog. of papers published from the Kodaikanal Observatory p. 31–41. **DWB**—The history of the Madras and Kodaikanal Observatory beginning with the establishment of the astronomical observatory at Madras in 1792, and the Kodaikanal Magnetic and Astrophysical Observatory in 1902. The present equipment, including meteorological instruments, is described and the daily observational program outlined. The important investigations and discoveries of the past 50 years are mentioned in detail and photographs of equipment in operation, a list of publications (1905–1950) and a table giving monthly averages of temperature, sunshine and rainfall for the station (lat. 10°14′N, long. 77°28′E, height 7688 ft.) included. *Subject Headings:* **1. Kodaikanal Observatory, India 2. Astrophysical observatories 3. Mountain meteorology 4. Publication lists 5. History of observatories.**—*M.R.*

OBSERVATIONAL DATA

See also: **Chronological table of heavy rains, Iwate Prefecture,** 4.6–176; **Water: analysis and utilization of data** (Smetana), 4.6–189.

4.6–35 551.506.3(421) 551.582(421)

*Marshall, W. A. L., **A century of London weather.** London, H. M. Stationery Office, **1952.** 103 p. 7 figs., 29 plates, numerous tables. M.O. 508. **GB-MO**—This volume contains an immense amount of statistical information about the climate and weather of London 1841–1949. It opens with averages and extremes of temperature, rainfall and sunshine for the year and for each month and season. Other tabulations discussed deal with visibility and recurrence of warm and cold spells. Monthly tables of temperature and rainfall are given for each year for Greenwich 1841–1870 and Kew 1871–1949. Finally, colored plates show annual and monthly departures of temperature, rainfall and sunshine from normal for each year, and day to day records in outstanding months. There are a few footnote references but no systematic bibliography. *Subject Headings:* **1. Local climates 2. Long period records 3. London, Eng.**—*C.E.P.B.*

4.6–36 551.506.5(99) 551.506.7(99)

Gibbs, W. J., Gotley, A. V. and Martin, A. R. (all of *Met. Branch, Australia*), **Heard and Macquarie Islands, 1948. Part I** (c) **Discussion.** *Australian National Antarctic Research Expedition, A.N.A.R.E. Reports, Series D,* V. I, Pt. I c, Oct. **1952.** 67 p. 28 figs., bibliog. p. 63–65. **DWB**—This report is primarily the discussion of the observations and charts which were published as reports a and b of Pt. I of Vol. 1 of the AN.N.A.R.E. Report, Series D (*see item* 3.5–52, May 1952, *MAB*). The history, geography and a description of the meteoro-

logical stations of Heard and Macquarie Islands are given. The instrumentation and types o surface and upper air observations taken are described. The individual surface observation are discussed with the aid of graphs and frequency distribution for each of the variables Charts of upper air soundings are given. The general pattern of the circulation in the Souther Hemisphere is described and the special data for synoptic studies in the Southern Hemisphere are outlined. The analyzed charts are discussed with the aim of demonstrating "a concept o genesis and behaviour of the polar front based on the rigid definition of the front as a density discontinuity." Topographic maps of the islands and plans of the stations are included *Subject Headings:* **1. Upper air soundings 2. Upper air observations 3. Meteorologica stations 4. Heard Island, South Indian Ocean 5. Macquarie Island, South Pacific Ocea 6. Antarctica. I. Australia, Dept. of External Affairs. Antarctic Div.**—*I.L.D.*

4.6–37 551.506.3

Poland. Państwowy Instytut Hydrologiczno-Meteorologiczny, **Mały atlas fenologiczny** [Pocket phenological atlas.] *Poland. Państwowy Instytut Hydrologiczno-Meteorologiczny Seria A, Instrukcje i Podreczniki*, No. 21, **1950.** 118 p. illus. **DWB**—A list of 23 plant and 6 birds (names in Polish and in Latin) recommended for use as phenological indicators i Poland is followed by a one page description and an illustration of the plant or bird. This "atlas" fulfills the requirements of one of the recommendations of the I.M.O. Commission or Agricultural Meteorology. *Subject Headings:* **1. Phenological codes 2. Observers manuals** —*M.R.*

4.6–38 551.506.8(43)

Schnelle, Fritz and Uhlig, Siegfried (*Bad Kissingen*), **Beiträge zur Phänologie Deutschlands. I. Karten des phänologischen Jahresablaufs der Einzeljahre 1936 bis 1944.** [Contributions to the phenology of Germany. I. Maps of the phenological sequences for the individual years 1936 to 1944.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte* No. 39, **1952.** 25 p. 28 figs., 3 tables, 54 maps, 17 refs. **DWB**—The fifty-four phenological maps represent the following six phenological phases and indicators: snow drop blossoming—prespring; beginning of field cultivation—prespring; emergence of oats, early spring; apple blossoming—full spring; winter rye blossoming—early summer; and winter rye harvest—midsummer. They are based upon phenological data collected for the following nine regions: Schleswig, Rhine-Main, Lower and Upper Rhine, Upper Bavaria, Halle-Leipzig, Silesia and East Prussia. The phenological data for each region are given for individual years. The differences in phenological sequences and vegetation characteristics between the various regions during the individual years and within each region from year to year and their relationship to temperature variations and to air mass characteristics are discussed in detail with the aid of numerical and graphical data and synoptic maps. The causes of the differences in plant development in the several regions and in the individual years and the possible variations in plant development are discussed very thoroughly. The application of phenological annual maps to agricultural planning, to agricultural labor force problems, to artificial rain making, to plant protection, to forestry and to medicine are considered briefly. *Subject Headings:* **1. Phenological data 2. Germany.**—*I.L.D.*

4.6–39 551.506.8:551.524.3

Schrödter, Harald, **Untersuchungen über die "Temperatursummenregel" an Hand der phänologischen Beobachtungen in Wernigerode 1854–1884 (unter besonderer Berücksichtigung einer Methode zur Bestimmung von Basistemperatur).** [Investigations into the "accumulated temperature rule" with the phenological observations in Wernigerode 1854–1884 (with special reference to a method for determining the basic temperature).] *Angewandte Meteorologie*, 1(8):225–234, Dec. **1952.** 3 figs., 4 tables, 27 refs., 6 eqs. **MH-BH**—Constants in hyperbola $T_m = c_1 + c_2/t$ (T_m = mean temperature during period above c_1, lowest temperature for growth, c_2 = accumulated temperature, t = days from beginning of growth to flowering) are determined for various plants for various starting dates, and their mean errors. For winter rye equations are $T_m = 4.4 + 303.5/t$ (t since April 15) or $4.4 + 379.8$ (since March 15). For snow-drop, $T_m = -5.3 + 411/t$ from Wernigerode data 1947–51, fits other places fairly well.

The equations have applications in regional agricultural meteorology. *Subject Headings:* **1. Accumulated temperatures 2. Phenology.**—*C.E.P.B.*

4.6–40 551.506.8:551.584.3

Weise, R., **Mikroklimatische Geländestudien an der Laubverfärbung der Reben im Herbst 1951 und ihre Folgerungen für den fränkischen Weinbau.** [Microclimatic regional studies of the foliage color of the vine in autumn 1951 and its consequences for Franconian vine culture.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 38:237–240, 1952. fig. **DWB**—A slight early frost in Lower Franconia on 8.10.51 in lower vineyards froze the leaves prematurely. Differences of color are used to show the lines of cold air drainage. *Subject Headings:* **1. Phenology 2. Topographic effects 3. Air drainage 4. Franconia, Germany.**—*C.E.P.B.*

INSTRUMENT CARRIERS

See also: **Radiation thermometer for measuring free air temp. from airplane** (Johnson), 4.6–49; **Mechanized snow surveys, Montana** (Work), 4.6–185; **Research of physical properties of upper atmos. with V-2** (Temple Univ.), 4.6–253.

4.6–41 551.507.321

Moore, Charles B. (*Gen. Mills Aero. Res. Lab., Minneapolis, Minn.*), **Plastic balloons: a platform for experiments in the upper atmosphere.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, 1952. p. 395–404. 3 figs., table, 13 refs.) **DLC**—A brief history of the development of plastic balloons and of their physical properties is presented. A detailed account is given of the construction of "skyhook" balloons developed by General Mills, Inc., the preparation for flight, flight behavior of the balloon and of its tracing and recovery. A table with data on dimensions and ceiling altitude of polyethylene balloons (General Mills type) is included. *Subject Headings:* **1. Plastic balloons 2. Skyhook balloons 3. Balloon recovery 4. General Mills, Inc.**—*I.L.D.*

4.6–42 551.507.321.4:551.507.2

Huss, Eduard, **Die Fesselballonmethod mit Schiff als Hilfmittel der aerologischen Grundlagenforschung.** [The captive balloon and ship as an aid to investigation of lower air layers.] *Annalen der Meteorologie*, 5(3/5):67–71, 1952. fig. **MH-BH**—A summary of the advantages of the use of a captive balloon on the Bodensee (Lake Constance) and the detailed researches carried out with it or in prospect. *Subject Headings:* **1. Captive balloons 2. Friedrichshafen, Germany.**—*C.E.P.B.*

4.6–43 551.507.352:551.508.85:551.508.765

Katz, Isadore (*Naval Res. Lab., Wash., D. C.*), **Naval Research Laboratory's R5D.** *Illinois State Water Survey Div., Bulletin*, No. 41:199–203, 1952. **DWB**—General description of the meteorological and radio instruments and their arrangement for efficient operation aboard a R5D airplane modified for the purpose of taking simultaneous measurements of electromagnetic signals and weather phenomena. The disdrometer and the total water collector are described in some detail. *Subject Headings:* **1. Radio weather instruments 2. Disdrometers 3. Air-borne instruments.**—*W.N.*

INSTRUMENTS

See also: **Naval Research Lab's R5D** (Katz), 4.6–43; **Objective method for measuring daylight factor** (Koch, Kaplan), 4.6–122; **Cooling power** (Thams), 4.6–219; **Investigation by photographic emulsion method of radioactivity from atmos. air** (Siksna), 4.6–241; **Aurora localization by 10 m high power radar technique, using rotating antenna** (Hellgren, Meos), 4.6–247.

4.6–44 551.508

Goldsmith, Paul and Roberts, Edward A. (*Ill. Inst. of Tech., Chicago*), **Meteorological measurements with quartz crystals.** *Electronics*, 25(6):144–147, June 1952. 6 figs. **DWB**—

The atmospheric pressure, temperature and dew point may be determined from effects on quartz crystals or on their vibrational characteristics. Two methods of measuring pressure are described and circuits used to measure frequency shown. The first system records changes in crystal due to damping effect of atmosphere on a vibrating crystal. Corrections must be made for temperature and humidity. The second method uses change in frequency of vibrating crystal produced by bending crystal under different air pressures. Crystal is used as a diaphragm over a vacuum cup. Temperature corrections are necessary. Temperature is measured by change in crystal frequency. Dew point is measured from cooling effect of moisture which deposits on crystal when artificially cooled. *Subject Headings:* **1. Quartz crystal indicators 2. Meteorological instruments 3. Pressure measurements.**—*M.R.*

4.6–45 551.508:551.509.1

Hoddinott, M. H. O., **Automatic receiver for weather data.** *Weather*, 8(1):3–7, Jan **1953.** 3 figs. **MH-BH**—A permanent record of the Morse short-wave broadcast from Dunstable is made on a home-built Undulator, in which the Morse note makes or breaks a circuit controlling an electromagnetic pen-mechanism. The mechanism is described and illustrated. *Subject Heading:* **1. Radio recorders.**—*C.E.P.B.*

4.6–46 551.508

Murrell, K. F. H., **The visual presentation of instrument data.** *Society of Instrument Technology, London, Transactions*, 4(1):1–12, **1952.** 10 figs., 31 refs. **GB-MO**—Experiments on accuracy of reading various types of scales are described and recommendations made about design of figures and pointers. *Subject Heading:* **1. Meters.**—*C.E.P.B.*

4.6–47 551.508.21

Albrecht, Fritz, **Einige neue Messgeräte für Ausstrahlung und Globalstrahlung.** [Some new instruments for outward and global radiation.] *Annalen der Meteorologie*, 5(3/5):97–121, **1952.** 12 figs., tables, 5 refs. German and English summaries p. 97. **MH-BH**—Includes descriptions with working diagrams, constants, etc. and some specimen results of 4 new instruments: 1) a 4-plate pyrgeometer compensated for wind, temperature conduction and reaction time; 2) pulse whole-sky pyrgeometer using a small milliammeter; 3) convex mirror pyrgeometer with light pointer galvanometer, for filter measurements of sky and outgoing radiation and 4) a bimetallic contact pyranometer with electric recording. *Subject Headings:* **1. Actinometers 2. Pyrgeometers.**—*C.E.P.B.*

4.6–48 551.508.21

Georgi, Johannes, **Neuer Absolut-Pyrheliograph von F.-E. Volochine.** [New absolute pyrheliograph of Volochine.] *Meteorologische Rundschau*, 5(9/10):181–182, Sept./Oct. **1952.** 2 figs., refs. **DWB**—Diagrams are given of a new modification of K. Ångström's compensated pyrheliometer and the receiving system. Calibration and sensitivity are described. Price about 1500 Swiss francs. *Subject Headings:* **1. Pyrheliometers 2. Volochine, F. E.**—*C.E.P.B.*

4.6–49 551.508.22:551.507.352

Johnson, J. C., **Report of research on a radiation thermometer for measuring free air temperature from an airplane in flight.** U. S. National Advisory Committee for Aeronautics, March 8, **1951.** 5 p. 3 figs. Mimeographed. **DWB**—A sensitive thermometer for measuring atmospheric temperature in flight is proposed. It is based on the principle of comparing the black body radiation of CO_2 in a cell with that at a distance in the atmosphere (12.5 to 17.5μ band). This device avoids the errors inherent in conductive heat exchange thermometers: namely those due to compression, evaporation and lag due to time required for heat flow in the bulb. A model instrument was built and tested in the laboratory. Sensitivity of 0.07°C per scale division was obtained. Suggestions for redesign and improvement are made. *Subject Headings:* **1. Radiation thermometers 2. Air-borne thermometers. I. U. S. NACA.**—*M.R.*

4.6–50 551.508.23

Taylor, Charles L. (*Penna. State Col.*), **A new sunshine recorder.** *American Meteorological Society, Bulletin*, 33(8):329–331, Oct. **1952.** 2 figs., 2 tables, 2 refs. **MH-BH**—The

unshine recorder, described in detail with the aid of a photograph, is based upon the principle f a differential air thermometer. The receptor consists of two small closed metal cells made f very thin sheet bronze. Each cell is constructed of two cylinders mounted eccentrically ithin another slightly larger cylinder so that the cells have a large exposed surface area but small enclosed volume of air. "A small ⅜ in. brass pipe is affixed to the unexposed side of ach of the cells" which "were painted a flat black and mounted on a frame." A comparison f the starting and stopping time of this recorder with the Marvin-type sunshine recorder as a unction of length of exposure indicates that the former responds more rapidly and shows reater sensitivity than the latter. *Subject Heading:* **1. Sunshine recorders.**—*I.L.D.*

4.6–51 551.508.25:551.521.61

Brown, D. A. H. (*Telecommunications Res. Estab., Min. of Supply, Gt. Brit.*), **A photocell mplifier for infra-red spectroscopy.** *Journal of Scientific Instruments*, London, 29(9):292–94, Sept. **1952.** 3 figs., 4 refs. **DWB**—An amplifier has been developed primarily for use ith photoconductive cells as detectors of infra-red radiation. The frequency chosen, 800 /s, is about optimum for most cells of the lead sulphide type used with chopped radiation. he bandwidth is 50 c/s and overall gain 2×10. Negative feedback reduces gain variations less than ±1/3% for a ±10% variation in power supplies. Noise level is equivalent to an put noise resistance of 50 KΩ. The amplifier is L.C. tuned. *Subject Heading:* **1. Infrared adiation instruments.**—*Author's abstract.*

4.6–52 551.508.25:551.521.61

†Lippert, Ernst, **Apparative Fortschritte in der Infrarot-Spektroskopie.** [Advances in pparatus for infrared spectroscopy.] *Zeitschrift für angewandte Physik*, 4(10):390–397, **952.** 20 figs., 2 tables, 78 refs. **DLC**—A systematic account of recent developments in ave-bands red —2.5μ, 2.5–50μ and above 50μ. Includes Perkin-Elmer spectrophotometer, ght sources, photometer principles, prism materials, grating spectrometer, filters, receivers ncluding photocells, and recorders. *Subject Headings:* **1. Infrared spectroscopy 2. Infrared adiation instruments.**—*C.E.P.B.*

4.6–53 551.508.26

Arbey, Louis (*Observatoire de Paris*), **Le premier thermomètre de Lavoisier de l'Obervatoire de Paris.** [The first thermometer of Lavoisier at the Paris Observatory.] *L'Astronomie*, Paris, 66:80–82, Feb. **1952. DWB**—An account taken from the archives of the aris Observatory, describing the three thermometers made by Lavoisier for the observatory 1782 and 1783. Scales, calibration and readings in the Observatory and in the caves entioned. *Subject Headings:* **1. Thermometers 2. History of meteorology 3. Lavoisier, ntoine Laurent 4. Paris Observatory.**—*M.R.*

4.6–54 551.508.41:551.508.71

Dinkelacker, Otto Friedrich, **Das Doppelbarometer als Druck-und Dampfdruckmesser nd seine Verwendung im wetterkundlichen Unterricht.** [The double barometer as pressure nd vapor pressure measurer and its application in teaching weather science.] *Germany. eutscher Wetterdienst in der US-Zone, Berichte*, No. 35:323–325, **1952.** 3 figs. **MH-BH**—he apparatus consists of 2 Torricelli tubes, one with a few drops of water on top of the mercury. *ubject Headings:* **1. Barometers 2. Vapor pressure recorders.**—*C.E.P.B.*

4.6–55 551.508.41

Gould, F. A. and Vickers, T., **Capillary depression in mercury barometers and manometers.** *ournal of Scientific Instruments*, 29(3):85–87, March **1952.** fig., table, 3 refs., 4 eqs. Notes y George Wm. Thomson, *ibid.*, 29(12):415, Dec. **1952. DWB**—A new table computed heoretically gives the capillary depression (in mm of mercury at 20°C, standard gravity) for ubes of bore 1–22 mm, meniscus height 0.1–2.0 mm, and surface tension 400, 450 and 500 yn/cm. *Subject Headings:* **1. Barometry. I. Thomson, George Wm.**—*C.E.P.B.*

4.6–56 551.508.43

Jameson, Harold, **Errors of aneroid barometers.** *Marine Observer*, 22(158):215–218, ct. **1952.** fig., 3 tables. **MH-BH**—Comparison of a number of ships' aneroids with mercury

barometers, on board or in port, showed large ranges of errors, mostly around 5 mb but up to 15.8 especially in aneroids uncompensated for temperature. *Subject Headings:* **1. Aneroid barometers 2. Instrument comparisons 3. Instrumental errors.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Hydrologic cycle, its relation to meteorological river forecasting** (Linsley), 4.6–8; **Weather forecasting** (Schwerdtfeger), 4.6–12; **Upper air charts** (Gr. Brit. Naval Weather Service), 4.6–33; **Automatic weather data receiver** (Hoddinott), 4.6–45; **Weather computing and so-called 2½ dimensional model** (Eady), 4.6–96; **Dynamic model of atmos. for numerical weather prediction** (Eliassen), 4.6–97; **What causes weather?** (Abbott), 4.6–116; **Avalanche forecasting, Brevières, Switzerland** (Sales), 4.6–183; **Old meteorological charts and world atlases** (Schlegel), 4.6–200; **Radioactivity of free air** (Garrigue), 4.6–240.

4.6–57 551.509.25:551.509.54

Bristor, Charles Lester (*U. S. Weather Bur., Wash., D. C.*), **Relating prognostic charts to winter precipitation at Sioux City, Iowa.** [Jan. 1952.] 11 p. chart, 7 figs. (some fold.), 5 refs. Typescript. **DWB**—This objective forecasting method is based on 700 mb prognostic contour patterns over the Midwest. The actual parameter being evaluated is the amount of vertical motion (convergence, divergence or thickness patterns) as estimated from curvature of isobars, direction of flow and intensity of trough in the vicinity of Omaha. A nomogram is provided for quantitatively evaluating some of these parameters. The cases of rain and no-rain are plotted for the two parameters D_n and $N-N_k$ (where D_n is distance of 700 mb low center from Omaha and $N-N_k$ is anomaly of number of isobars in a given distance) for all cases except those eliminated by other tests. Although a number of "no rain" cases are included in the "best fit" envelope, further analysis (verified against eleven additional months of data) eliminated many of these cases. *Subject Headings:* **1. Objective forecasting 2. Prognostic charts 3. Precipitation forecasting 4. Sioux City, Iowa.**—*M.R.*

4.6–58 551.509.25

Wasko, Peter E. (*Hq. Air Weather Serv., Wash., D. C.*), **The control-line method of constructing prognostic charts.** *American Meteorological Society, Bulletin*, 33(6):233–236, June 1952. 3 figs. **MH-BH**—This method is based largely upon the "path method" concept. On the surface map, isobars at 15 mb spaced intervals are drawn in more heavily than others, and on the 700–500 and 300 mb charts, contour lines 600, 800 and 1200 ft apart, respectively, are generally used in winter. The isolines selected are such that one control isoline is near the southern border of the westerlies and one near the northern border. The intersection of *control isolines*, fronts or ridge and trough lines constitute control points which can be projected by the path method. The method of extrapolation for constructing a 24h prognostic chart is illustrated in detail and the advantages of the "control line" method are discussed. *Subject Headings:* **1. Prognostic charts 2. Control-line method.**—*I.L.D.*

4.6–59 551.509.3

Berkes, Zoltán, **A korszerü idöerölejelzés alapfogalmai, SZ. P. Hromov: a szinoptikus meteorológia alapfogalmai c. mü ismertetése.** [Fundamental ideas of modern forecasting. (Review of the work of S. P. Khromov.)] *Időjárás*, 56(5/6):164–167, May/June 1952. **DWB**—Review of the Hungarian translation of Khromov's "Osnovy sinopticheskoĭ meteorologii" (Principles of synoptic meteorology). The translation was prepared by a team of Hungarian translators and published in May 1952 (Budapest, Akademiai kiadó) under the title "A szinoptikus meteorológia alapjai." It is based on the completely re-written 1948 (Leningrad) edition of Khromov's book. The review gives the book's contents chapter by chapter and points out the scientific importance and practical applications of the work. Comments on the translation are added. (For abstract of the original (1948) *see item* 2A–29, Jan. 1951, *MAB.*) *Subject Headings:* **1. Weather forecasting 2. Translations 3. Reviews. I. Khromov, Sergeĭ Petrovich.**—*G.T.*

4.6–60 551.509.3:519.241.1

Diehl, H., **Neue Mehrfachkorrelationstabellen zur Verwendung für Witterungsvorersagen.** [New multiple correlation tables for application to weather forecasting.] *Meteorologische Rundschau*, 5(9/10):168–172, Sept./Oct. **1952.** fig., 7 refs. **DWB**—A brief account is given of BAUR's multiple correlation table (example, 4 variables, 72 cells), criteria of validity and application to 2–7 day forecasting at Bad Kissingen. It allows ready introduction of new ideas as shown by a scheme of forecasting 1–3 day pressure changes from zonal circulation. *Subject Heading:* **1. Statistical forecasting.**—*C.E.P.B.*

4.6–61 551.509.3

Lönnqvist, Olov (*Swedish Met. and Hydrol. Inst.*), **To the comparison between numerical methods and methods now in use for forecasting meteorological charts.** *Tellus*, 4(3):182–200, Aug. **1952.** 5 figs., table, 5 refs. **MH-BH**—Methods now in common use for making prognostic charts to a large extent are based on time derivatives, while the numerical methods start from space derivatives. That is the fundamental difference between them. It is shown that the present methods give at times very good results, and that the degree of success varies with the weather situation, characterized, e.g., by the average interdiurnal pressure change over the test area. Because of this variation it would be desirable that every test of a numerical method includes a comparison with results obtained at some forecasting center or, at least, with the result of pure extrapolation. *Subject Headings:* **1. Numerical forecasting 2. Prognostic charts.**—*Author's abstract.*

4.6–62 551.509.31

Monin, A. S., **O perspektivakh razvitiia kratkosrochnoĭ sinoptiki.** [Perspectives of the development of short range forecasting.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Izvestiia*, 84(2):180–188, March/April **1952.** 12 refs. **DLC**—The complimentary nature of empirical and theoretical methods of short range forecasting are stressed. The empirical approach represented by "Advective dynamic analysis" (ADA), developed in the Soviet Union by KH. P. OGOSIAN and M. L. TABOROVSKIĬ involves a three dimensional analysis of the troposphere based upon aerological data and is especially intended for large scale disturbances of the upper pressure pattern. It is limited by the use of 700 and 500 mb charts and it utilizes data of vertical soundings and cross sections; and its fundamental basis is the advective and dynamic changes of pressure and temperature and their interrelationships. The inadequacies of this method are pointed out. The theoretical approach is concerned with the mechanism of pressure change. The theoretical concepts on the pressure change developed by N. E. KOCHIN, M. I. IUDIN and especially by IA. KIBEL', OBUKHOV, etc. and the significance of the concept of "second approximation" of KIBEL' in analyzing the energy transformation in cyclo- and anticyclogenesis are discussed. Suggestions for ways of applying hydrodynamic theory and more intensive aerological observations by the ADA approach for short range forecasting are proposed. *Subject Headings:* **1. Short range forecasting 2. Kibel's method of forecasting 3. Advection dynamic analysis.**—*I.L.D.*

4.6–63 551.509.31:551.515.13

Müller-Annen, Hans, **Zur Prognose der Zugbahnen von Tiefdruckgebieten. Teil 2: Zugbahnen der Druckänderungsgebiete und synoptische Erklärungen.** [On forecasting tracks of depressions. Pt. 2: Isallobaric tracks and synoptic explanations.] *Annalen der Meteorologie*, 5(6):161-168, **1952.** 5 figs., 5 refs. **DWB**—Types of tracks of 24-hr centers of pressure fall and rise are illustrated and described in relation to upper air currents. Author then gives two rules for tracks of depressions: "warm air" and "cold air" rules, and synoptic generalizations about deepening or filling and movement of depressions, with schematic sketches and physical explanations, e.g., when the coherence of a series of rises and falls is broken, a new deep depression will develop. For future of a depression not only its present state but its prehistory and the changes in its rear are important. *Subject Headings:* **1. Isallobars 2. Cyclonic activity.**—*C.E.P.B.*

4.6–64 551.509.312

Regula, Walter, **Untersuchungen über die Grundlagen einer Vorhersage-Topographie.** [Investigations into the bases of a topographic forecasting map.] *Meteorologische Rundschau*, 5(9/10):164–168, Sept./Oct. **1952.** 8 figs., 10 refs. **DWB**—Forecasting 24 hr and 3 hr pressure changes is related to 500 mb topography as a steering surface and changes of 1000–500 mb relative topography. Advection tendency chart helps but direct correlation of 24 hr change of relative topography with isopotential curvature is only −0.45. Relation between relative and absolute topography is investigated with good results, chief difficulty being non-advective changes of relative topography, which depends on temperature difference air-water and austausch coefficient. The 6 hr and 24 hr advective and non-advective changes are calculated for the deep depression of Dec. 28–29, 1951; 24 hr changes have a correlation of −0.88. *Subject Headings:* **1. Isallobaric analysis 2. Upper air analysis.**—*C.E.P.B.*

4.6–65 551.509.317

§Barks, E. A., **Some effects of outbreaks of cold polar or Arctic air across north-eastern Canada.** *Canada. Meteorological Division, Cir*-1949; *Local Forecast Study*, No. 7, May 25, **1951.** 2 p. chart. **DWB**—The intrusion of very cold air tongues causes great differences and even reversal of the winds between 1000 and 700 mb levels. Illustrated by chart for Jan. 31, 1951. *Subject Headings:* **1. Upper air winds 2. Aeronautical meteorology 3. North-east Canada.**—*C.E.P.B.*

4.6–66 551.509.317

James, R. W., **Anomaly charts and forecasting.** *Meteorological Magazine*, London, 82(968):33–37, Feb. **1953.** 4 figs., 3 refs. **MH-BH**—Advocates the use of charts based on differences of instantaneous upper pressure levels from seasonal means to study evolution of vertical structure of perturbations. Illustrated by 500 and 300 mb anomalies over U.S.A., April 19, 1949. *Subject Heading:* **1. Upper air analysis.**—*C.E.P.B.*

4.6–67 551.509.317

Smith, C. V. and Forsdyke, A. G., **Some downstream features associated with large amplitude troughs in upper circulation patterns.** *Great Britain. Meteorological Research Committee, M.R.P.* 752, September 22, **1952.** 15 p. 5 figs., 4 tables, 3 refs. Mimeographed. **DWB**—Circumpolar 500 mb polar charts were examined for simple troughs over America and 4 following days. Changes in amplitude or new formations of downstream troughs are tabulated but little relation was found except when the "primary" trough persists for 2–3 days. The same procedure was applied to 1000–500 mb thickness troughs. The results do not suggest that oscillations are regularly transferred downstream, but rather the development of each trough by local energy. The modes of formation of downstream troughs are classified as a) simple growth, b) amalgamation or "phasing in," c) blocking patterns. Examples illustrated are: a) Feb. 13–15; b) April 21–23 and c) Jan. 24–28, May 17–19, Nov. 25–27. *Subject Heading:* **1. Synoptic aerological studies.**—*C.E.P.B.*

4.6–68 551.509.33

Stagg, James Martin, **Review of long range forecasting methods.** *Great Britain. Meteorological Research Committee, M.R.P.* 721, 26th February, **1952.** 12 p. Mimeographed. **DWB**—Author briefly reviews methods of extended forecasting by regression equations, pressure waves, symmetry, singularities, trends, long waves in zonal circulation, air flow and pressure cells, analogs, solar phenomena and ozone. None of these are adequate owing to lack of knowledge of how the circulation works. Recommendations for development in Britain include behavior of zonal westerly circulation at 500, 300 and 100 mb levels, partly by 5-day mean charts, studies of heat flow, and 5, 10 and 30 day weather anomalies. *Subject Heading:* **1. Long range forecasting.**—*C.E.P.B.*

4.6–69 551.509.53:518.2

Ostroumov, Z. S., **Uproshchennyĭ sposob opredeleniia dat perekhoda srednesutochnykh temperatur cherez opredelennye znacheniia putem vychisleniia.** [Simplified method of determining the date of passage of mean daily temperature through definite values by calcula-

ion.] *Meteorologiia i Gidrologiia*, No. 3:59–60, Nov. 1950. fig., table, 2 refs. **DLC**—This method requires the solution of a simple geometrical problem: the determination of the magnitude of a single perpendicular in two similar right angle triangles given the magnitude of two other perpendiculars and the magnitude of the sum of the unknown perpendiculars. The equation $b=an/a+a_1$ is derived by the method of proportionality where $n=b+b_1$ the number of days between the fifteenth number of corresponding months. The magnitude b is the number of days which must be added to the mean of the month in order to obtain the date of the passage of the temperature through the given value. *Subject Headings:* **1. Temperature forecasting 2. Mathematical techniques.**—*I.L.D.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE

See also: **Conference of Ionospheric Physics** (Penna. State Col.), 4.6–3; **Atmos. of other planets** (Hess, Panofsky), 4.6–5; **Atmos. of earth and planets** (Kuiper), 4.6–6; **Relative high stratosphere temp., Feb. 1951** (Scrase), 4.6–134; **Influence of capillary conductivity, depth of wetting on moisture retention in soil** (Richards, Moore), 4.6–193; **Variation effectiveness of solar eruption according to its location** (Kamiyama), 4.6–229; **Solar physics and atmos. of earth** (Nicolet), 4.6–231; **Polarization of low frequency ionosphere echoes** (Watts), 4.6–250; **Research of physical properties of upper atmos. with V-2** (Temple Univ.), 4.6–253.

4.6–70 551.510.41:541.14

Blacet, F. E. (*Univ. of Calif.*), **Photochemistry in the lower atmosphere.** *Industrial and Engineering Chemistry*, 44(6):1339–1342, June **1952.** table, 20 refs. **DLC**—A brief description and explanation is given of the solar spectrum obtained in the lower atmosphere, which is arbitrarily thought of as the atmosphere within approximately 1 mile of sea level. High altitude photochemical reactions are considered in terms of probability of occurrence at low altitudes. Gaseous phase reactions in unpolluted air which are permitted in the lower atmosphere are discussed on the basis of photochemical principles. Photochemical reactions which may occur in polluted atmospheres are discussed. They include the photolysis and oxidation of SO_2 and of aldehydes, ketones, hydrocarbons, and other organic compounds. In the oxidation processes it is shown that ozone may be expected as a by-product. Emphasis is given to the role of NO_2 as a possible photosensitizer in the atmospheric oxidation of air pollutants. *Subject Headings:* **1. Atmospheric composition 2. Photochemistry 3. Solar spectrum.**—*Author's abstract.*

4.6–71 551.510.41:551.584.43:633.491

Crook, E. M. and Watson, D. J., **Studies on the storage of potatoes. II. The temperature conditions inside potato clamps. III. The composition of the atmosphere in a potato clamp.** *Journal of Agricultural Science*, Cambridge, England, 40(3):199–232, July, **1950.** 14 figs., 10 tables, 13 refs. Abstracted from reprint. **DLC**—Thermograph bulbs were placed in a potato clamp 8′6″ across and 3′4″ high covered by 5 in. straw and 6 to 15 in. earth. It was found that clamp temperatures were 1–5°C above air temperature (rising to 20°C when potatoes rotted) and followed major but not minor variations of air temperature. Diurnal variation did not penetrate straw. Temperature was higher on leeward than on windward side. The composition showed a gradual increase of CO_2 from 0.06 to 0.86%, decreasing during windy periods. CO_2 production and corresponding oxygen depletion had no practical effects. *Subject Headings:* **1. Potato storage 2. Rick temperatures 3. Carbon dioxide variations.**—*C.E.P.B.*

4.6–72 551.510.41

Hock, R. J.; Erikson, Harald; Flagg, Walter; Scholander, P. F. and Irving, Laurence, **Composition of the ground-level atmosphere at Point Barrow, Alaska.** *Journal of Meteorology*, 9(6):441–442, Dec. **1952.** fig., 11 refs. **MH-BH**—Analyses gave average CO_2 content as $0.040\pm.015\%$ and O_2 as 20.935%. No annual variation found. *Subject Headings:* **1. Atmospheric composition 2. Carbon dioxide 3. Point Barrow, Alaska.**—*C.E.P.B.*

4.6–73 551.510.41:551.593.55

Kaplan, Joseph (*U.C.L.A., Los Angeles, Calif.*). **The chemosphere.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 99–108. 2 tables, 5 refs.) **DLC**—The term chemosphere represents the existence and importance of chemical reactions in the atmosphere. The author discusses the history of the discovery of atmospheric ozone and its function, the photochemistry of oxygen and of oxygen-hydrogen atmospheres, the chemical role of nitrogen and of its compounds, the visible afterglow in nitrogen or the Lord Rayleigh afterglow which is produced by the energy released by the combination of metastable N_2 atoms, the molecular oxygen afterglow and the night afterglow produced by the OH molecule. *Subject Headings:* **1. Chemosphere 2. Chemical composition of atmosphere 3. Nitrogen afterglow.**—*I.L.D.*

4.6–74 551.510.41:546.264

Kreutz, Wilhelm, **Kohlensäuregehalt der unteren Luftschichten in Abhängigkeit von Witterungsfaktoren.** [CO_2 content of the lower atmospheric layers in relation to weather factors.] *Angewandte Botanik*, 23(3):89–117, **1941.** [1952]. 11 figs., 7 tables, 4 refs. **DA.** Abstracted from reprint.—The amount of CO_2 was measured at Giessen every 1–2 hours at ground, 0.5, 2 and 14 m; diurnal and annual curves are drawn. Mean volume 0.4385%, decreasing from ground upwards in lowest layers and then increasing. Amount decreases with increasing radiation, with falling pressure and (doubtfully) with increasing precipitation. *Subject Headings:* **1. Carbon dioxide 2. Atmospheric composition 3. Giessen, Germany.**—*C.E.P.B.*

4.6–75 551.510.42:523.51

†La Paz, Lincoln (*Univ. of New Mexico*), **Meteoroids, meteorites and hyperbolic meteoritic velocities.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 352–393. 3 tables, 67 refs., eqs.) **DLC**—This extensive review is concerned with the impact effects of meteorites upon earth objects, the establishment (independently of visual determination of path lengths and directions) of the fact that certain meteorites were moving in hyperbolic orbits before their collision with the earth and with a proposal for a new classification of the cosmic material encountered by the earth on the basis of differences in chemical composition, in size and heliocentric velocity. *Subject Headings:* **1. Meteorites 2. Meteorite velocities.**—*I.L.D.*

4.6–76 551.510.535

Bhargava, B. N., (*Kodaikanal, India*), **A new early-morning ionospheric phenomenon.** *Nature*, London, 170(4336):983–984, Dec. 6, **1952.** fig., ref. **DWB**—On 60% of mornings ionospheric echoes ceased some minutes to several hours before sunrise and reappeared about ground sunrise at greater virtual heights (300–500 km). *Subject Heading:* **1. Ionospheric variations.**—*C.E.P.B.*

4.6–77 551.510.535:523.78

Minnis, C. M., **E region during the solar eclipse of February 25, 1952.** *Nature*, London, 170(4324):453, Sept. 13, **1952.** fig., 3 eqs. **DWB**—Changes in electron density during (N) a solar eclipse can be represented by $\frac{dN}{dt}=q-d'N^2$ in which q is rate of electron production and d' is the effective recombination coefficient. Since the disc radiation is not uniformly distributed and if the ionizing radiation is similarly distributed:

$$q=K\cos_x\,(A_xJ_0+J_s) \text{ so that } \frac{K}{\alpha'}(A_xJ_0+J_s)=\frac{1}{\cos_x}\left[\frac{1}{\alpha'}\frac{dN}{dt}+N^2\right](=J)$$

Measurements of f_0E were made during the eclipse and J was computed for several values of α' and computed points shown on a graph. The observations indicate that the uniform (J_0) and nonuniform (J_s) components have magnitudes of 200×10^8 cm^{-6} and 60×10^8 cm^{-6} respectively. "Part of the non-uniform component is divided about equally between the east and west limbs of the sun, since a sharp fall in J occurred just after first contact and a similar

rise preceded fourth contact." *Subject Headings:* **1. E layer 2. Solar eclipses 3. Electron density.**—*I.L.D.*

4.6–78 551.510.535:550.389

Minnis, C. M., **The graphical representation of the longitude effect in F2-region.** *Journal of Atmospheric and Terrestrial Physics*, 2(5):261–265, **1952.** 3 figs., table, 6 refs. **DWB**—The change in the critical frequency for the F2 layer along a line of latitude depends more on the magnetic dip angle than on true geomagnetic latitude. From the geographical distribution of the dip angle LMT charts are drawn showing zones within which change in fF_2 along any line of latitude does not exceed 10% but these are too complex. It is suggested that a set of universal time charts would be preferable. *Subject Headings:* **1. F2 layer 2. Magnetic dip.**—*C.E.P.B.*

4.6–79 551.510.53

†Mitra, Sisir Kumar (*Univ. of Calcutta, India*), **General aspects of upper atmospheric physics.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 11:19–54, **1952.** 6 figs., 3 tables, 22 refs. **DWB**—As an introductory speech for the Conference on Ionospheric Physics, Prof. Mitra outlined in detail our knowledge of the upper atmosphere in all of its ramifications, and presented a number of problems for future study. The escape of gases in the fringe region, illumination, meteor trails, auroras, radio wave soundings, solar and cosmic radiation effects, ionization, luminescence, winds, effect on weather conditions in the troposphere (and vice versa), extent of the atmosphere, normal state of pressure and temperature, etc. are discussed and many aspects illustrated. *Subject Headings:* **1. Ionospheric physics 2. Ionospheric research.**—*M.R.*

*4.6–80 551.510.535

Mitra, Sisir Kumar, **[Symposium on] the physical characteristics of the upper atmosphere.** *U. S. Air Force. Cambridge Research Center. Geophysical Research Papers*, No. 12:21–39, **1952.** 2 refs. **DWB**—The discussion dealt with some unsolved problems, such as: 1) the height of the atmosphere where the diffuse separation begins, 2) the temperature in and above the E layer regions, 3) the distribution of atomic nitrogen, 4) origin of the F2 layer, 5) the nature of the ionized regions responsible for the sporadic E, E_S, 6) origin of the winds at the E and F layer heights, 7) origin of the sodium in the upper atmosphere and 8) the correlation between weather and the ionosphere. Although the topics were but briefly discussed, many theoretical considerations and suggestions were given by the contributors. *Subject Headings:* **1. Ionospheric physics 2. Upper atmosphere research.**—*W.N.*

4.6–81 551.510.535

Miya, Kenichi (*Central Radio Wave Observat. R.R.C.*), **Consideration on the measurement of vertical incidence ionosphere attenuation in high frequency.** *Japan. Science Council. Ionospheric Research Committee, Report of Ionosphere in Japan*, 5(4):201–202, **1951.** 7 eqs. **DWB**—A short note about the calculation of the ionosphere attenuation using the difference between field intensities of the "one hop and two hop" reflection waves observed simultaneously. The result coincides with the result obtained by means of the conventional method, using the field intensity of the "one hop" reflection wave. *Subject Heading:* **1. Ionospheric attenuation.**—*A.A.*

4.6–82 551.510.535:535.6

Motzo, M. (*Radiopropagation Studies' Center, Inst. of Techn. Physics, Univ. of Naples*), **Curve teoriche di risonanza nell, interazione tra onde elettromagnetiche, per incidenza verticale nella ionosfera.** [Theoretical curves for gyrointeraction between electromagnetic waves crossing the ionosphere at a vertical incidence.] *Il Nuovo Cimento, Ser. 9*, 9(3):213–219, March 1, **1952.** 3 figs., 2 tables. English summary p. 219. **DLC**—It is pointed out that V. A. Bailey developed a theory for calculating the gyrointeraction between two electromagnetic waves crossing the same ionospheric region, one of them having an oblique incidence. The theoretical curve representing this phenomenon is presented. The author offers a similar curve for gyrointeraction between successive waves crossing the ionospheric E-layer at a

vertical incidence. This method is claimed to be more practical for experiments. Values for intensity of the electromagnetic field of the disturbing wave and for the index of interaction are tabulated. *Subject Headings:* **1. Electromagnetic waves 2. Ionospheric research 3. E layer 4. Italy.**—*G.T.*

4.6–83 551.510.535:551.521.6:551.594.6

Pawsey, J. L., McCready, L. L. and Gardner, F. F., **Ionospheric thermal radiation at radio frequencies.** *Journal of Atmospheric and Terrestrial Physics*, 1(5/6):261–277, **1951.** 9 figs., 2 tables, 6 refs. **MH-BH**—Minimizing man-made radio noises and atmospherics, the thermal radiation from the ionosphere has been identified and measured. The electron temperature at 70–80 km was found to be 240–290°K. This paper describes the equipment used and shows how to distinguish between different noises. *Subject Headings:* **1. Ionospheric radiation 2. Radio noise 3. Temperature of the ionosphere.**—*A.A.*

4.6–84 551.510.535

*Pfister, W. (*U. S. Air Force Cambridge Research Center*), **Studies of ionospheric region E [and discussion].** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 11:235–254, **1952.** figs., 14 refs., 30 eqs. **DWB**—Author demonstrates that the E layer only in its upper part above the absorption or D region, may be represented by a simple Chapman layer, and that neglecting of the earth's magnetic field may result in overestimating the thickness of the layer by 20% or more. Although no definite statement for or against the preionization process of O_2 can be made, author's theory of the O_2 ionization above the dissociation level, and of a linear increase of the atmospheric scale height is favored by certain arguments. Ionospheric winds might disturb the regular behavior of the height variations. *Subject Headings:* **1. E layer 2. Ionization.**—*W.N.*

4.6–85 551.510.535:523.7

Piddington, J. H., **The modes of formation of the ionospheric layers.** *Journal of Geophysical Research*, 56(3):409–429, Sept. **1951.** 2 figs., 2 tables, 52 refs. 8 eqs. **MH-BH**—Data obtained during eclipses (1932–1947) by various authors lead to the following conclusions regarding the formation and structure of the ionosphere: 1) the rates of electron disappearance seem to be much higher and consequently the number of ionizing quanta higher than previously estimated. However the F_2 region may be much thicker than supposed so that maximum remains unchanged, or tidal effects may complicate the picture by causing large vertical movements of ions; 2) residual effects during eclipses indicate that there is probably a nonsolar source of electron production, such as electric currents flowing in the E and maybe the D region. Confirmation exists in correlation with magnetic and auroral effects; 3) ionizing emissions do not come from entire corona but from the lower chromosphere or in transition regions which may exist at the base of the corona. Also near sunspots or disturbances of the chromosphere there are regions of excessive emission; 4) the emission spectrum shows the following features: H Lyman spectrum (13.5 eV), He(I) spectrum at 24.6 eV, He(II) spectrum at 54 eV, line and continuous emission from atomic O, N, Ne, C up to several hundred eV, also X rays ranging down to 3Å or to <1Å during solar flares and 5) the F_1 and F_2 layers can be accounted for by the above features. The D layer can be accounted for by two agencies such as X rays and electric currents of a few thousand electron volts and the E layer by emission of a few hundred electron volts from the chromospheric transition region. *Subject Headings:* **1. Ionosphere formation 2. Solar physics 3. Ionospheric layers.**—*M.R.*

4.6–86 551.510.535

Rawer, Karl and Argence, Émile, **Sur quelques caractéristiques de la région E de l'ionosphère.** [Some characteristics of the E region of the ionosphere.] *Académie des Sciences, Paris, Comptes Rendus*, 233(20):1208–1210, **1951.** 5 refs., eq. **DWB**—A determination of the characteristic constants of the E region and calculation of the values of the effective layer and of the number of quanta corresponding to the observed ionization. Also a comparison of the quantitative results of PENNDORF obtained for the dissociation of O_2 and the hypothesis that the E layer is formed by the photoionization of this molecule. Conclusion is that O_2 dissociation occurs at a higher altitude than proposed by PENNDORF because the ionization

processes cannot be attributed to O_2 dissociation but to X-ray action. *Subject Headings:* **1. Ionospheric composition 2. E layer 3. Oxygen dissociation 4. Ionization.**—*From authors' abstract.*

4.6–87 551.510.535

Rawer, Karl; Bibl, Klaus and Argence, Émile, **Sur la détermination des nombres de chocs des régions E et F de l'ionosphère.** [On the determination of the number of echoes in the E and F regions of the ionosphere.] *Académie de Sciences, Paris, Comptes-Rendus*, 233(12): 667–668, Sept. 17, 1951. refs., eqs. **DWB**—During Nov. 1949–April 1950, and Feb. 1951, 32 nighttime observations were made of the F region at 4 frequencies. The number of echoes have been analyzed and coefficients established according to usual methods. The decrease in absorption and the effect of focalization have been considered in the calculations. A similar series has been obtained from noon data for five frequencies in the E region. The variation of absorption and the influence of absorption is calculated. *Subject Headings:* **1. Ionospheric echoes 2. Ionospheric absorption 3. E layer 4. F layers.**—*M.R.*

4.6–88 551.510.535

Shmoys, J. (*N. Y. U., New York*), **Limitations on the calculation of expected virtual height for specific ionospheric distributions.** *Journal of Geophysical Research*, 57(1):95–111, March 1952. 9 figs., 10 refs., eqs. **MH-BH**—The difficulties with the geometric optics ("classical") definition of virtual height are discussed. The more general definition of virtual height in terms of the derivative of the phase of the reflection coefficient with respect to frequency is derived. It is then shown that the former definition can be derived from the latter, if phase integral method is used. The two definitions are compared in the specific examples of linear, rectangular, Epstein, and parabolic charge distributions. It is demonstrated, by means of examples, that the relation between virtual height and frequency derivative of phase is not valid when the reflected wave contains more than one pulse. In this case the frequency derivative of phase cannot be interpreted as the time delay of any one of the pulses. *Subject Headings:* **1. Ionospheric structure 2. Virtual height calculations 3. Ionospheric reflection.**—*Author's abstract.*

4.6–89 551.510.535:551.594.7

Shmoys, J., **The reflection coefficient of the exponential layer.** *Journal of Geophysical Research*, 57(1):142–143, March 1952. fig., 8 eqs. **MH-BH**—Theoretical curves are shown for reflection coefficient as a function of frequency for the absorption coefficients $A = 10^{-20}$, 10^{-21} and 5×10^{-22}cm^2 ($\chi = 0^0$, $\theta - 0$), as calculated for the exponential layer, and compared with MITRA's curves calculated by using the parabolic approximation. The use of the exponential approximation makes variation of reflection coefficient more rapid. (*See item* 3.5–126, May 1952, *MAB.*) *Subject Headings:* **1. Ionospheric reflection coefficients 2. Exponential layer 3. D layer. I. Mitra, A. P.**—*M.R.*

4.6–90 551.510.535

Smith, F. G., **Ionospheric refraction of 81.5 Mc/s radio waves from radio stars.** *Journal of Atmospheric and Terrestrial Physics*, 2(6):350–355, 1952. 3 figs., 8 refs. **DWB**—Apparent regular movements of 4 radio stars are ascribed to "wedge refraction," i.e., to E–W gradients of the total electron content of the ionosphere. *Subject Heading:* **1. Ionospheric structure.**—*C.E.P.B.*

4.6–91 551.510.535:621.396.8

Somayajulu, Y. V. (*Wireless Res. Lab., Andhra Univ.*), **Oblique incidence pulse observation of the ionosphere near the maximum usable frequency.** *Current Science*, 21(6):155–156, June 1952. fig., ref. **DWB**—Pulse transmission experiments at frequency 21.7 Mc/s over a distance of about 1500 km at Delhi indicate that APPLETON's and BEYMAN's explanation of a parabolic region of the reflecting layer (F2) is correct since the sequence of observation was similar and particularly because a sudden increase in the signal intensity was clearly observed. Detailed account to be published. *Subject Headings:* **1. Radio wave propagation 2. Ionosphere 3. F2 layer 4. Delhi, India.**—*W.N.*

4.6–92 551.510.535

Underhill, Bradford B. (*Penna. State Col., State College, Penna.*), **Ionospheric research at the Pennsylvania State College.** *U. S. Air Force. Cambridge Research Laboratories, Geophysical Research Papers*, No. 7:143–153, Dec. **1950.** 7 figs. **DWB**—An account of the research work at the Radio Propagation Laboratory. The problem of frequencies below the broadcast band is the subject of primary interest. The diurnal changes of height and absorption at vertical and oblique incidence at 150 kc/sec are determined. *Subject Headings:* **1. Ionospheric research 2. Radio wave propagation. I. Pennsylvania State College. Radio Propagation Laboratory.**—*A.A.*

4.6–93 551.510.535:533.16

Yerg, Donald G. (*Geo-Science, Inc., Wash. Grove, Md.;* now at *Penna. State Col., State College, Penna.*), **A tentative evaluation of kinematic viscosity for ionospheric regions.** *Journal of Geophysical Research*, 57(2):217–220, June **1952.** table, 5 refs., 4 eqs. **MH-BH**—The kinematic viscosity, n/p where n is the molecular viscosity and p is the density, becomes indefinitely large as the density approaches zero, when n is computed according to conventional concepts. A re-examination of MAXWELL's kinetic theory development of molecular viscosity suggests a change in the limits of integration that leads to a correction term. The resulting equation indicates that the kinematic viscosity reaches a maximum in the F-region and approaches zero with further increase in height. *Subject Headings:* **1. Viscosity 2. Ionospheric structure.**—*Author's abstract.*

DYNAMICS OF AN ATMOSPHERE

4.6–94 551.511

Azpiroz Yoldi, Miguel, **Sobre movimiento relativo de un fluide homogeneo e incompresible.** [On the relative motion of a homogeneous and incompressible fluid.] *Revista de Geofisica*, Madrid, 11(42):146–153, April/June **1952.** 5 refs., eqs. **DWB**—ROSSBY's solution of the equations of motion of a homogeneous and incompressible fluid, in contrast with the surface of a sphere or plane revolving with uniform speed is extended to a particular case as developed by CHARNEY. Finally, the solution of STEWARTZ (1940, 1943) for the case of 3 anticyclones is presented, wherein the distribution of pressure and speed are calculated as a function of the distance from the center of the anticyclone. *Subject Headings:* **1. Experimental hydrodynamics 2. Barotropic theory 3. Anticyclone structure 4. Rossby hydrodynamic equation.**—*From author's abstract.*

4.6–95 551.511:551.551:551.554:551.524.4:551.571.4

Björgum, O., **On the velocity, temperature, and humidity profiles in the lower atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 79(339):84–93, Jan. **1953.** 7 figs., 16 refs., 41 eqs. **DWB**—Assuming that eddy viscosity, eddy conductivity and eddy diffusivity in lowest 25 m are uniquely determined by gradients of velocity, potential temperature and specific humidity, logarithmic expressions are derived for mean velocity, potential temperature and humidity at height $z-d$ where d is zero plane displacement. These agree with observations by A. C. BEST (1935) and H. U. SVERDRUP (1936). *Subject Headings:* **1. Humidity lapse rate 2. Temperature profiles 3. Eddy flux 4. Wind profiles.**—*C.E.P.B.*

4.6–96 551.511:551.509.3

Eady, E. T. (*Imperial College, London*), **Note on weather computing and the so-called 2½-dimensional model.** *Tellus*, 4(3):157–167, Aug. **1952.** bibliog., 49 eqs. **MH-BH**—The problem of setting up a system of equations by means of which the future large-scale flow pattern might be computed, using an electronic calculating machine, in a reasonable time and with maximum accuracy and efficiency, is discussed. Equations determining the development of a two-parameter, two-dimensional "model," capable of representing the major features of motion of a baroclinic atmosphere, are derived. Tests of the model are made on some representative problems, the accurate three-dimensional solutions of which are known. *Subject Headings:* **1. Weather forecasting 2. Atmospheric models 3. Electronic computers.**—*Authors' abstract.*

4.6–97 551.511:551.509.3

Elliassen, Arnt (*Met. Inst., Oslo*), **Simplified dynamic models of the atmosphere, designed for the purpose of numerical weather prediction.** *Tellus*, 4(3):145–156, Aug. 1952. 6 figs., refs. 54 eqs. **MH-BH**—The properties of several atmospheric models, which have been proposed for the purpose of numerical computation of prognostic maps, are discussed, and a new version of the "2½-dimensional model" is given. It is pointed out that the "barotropic" model is unable to explain adequately the growth of wave perturbations, and that the advective model gives too strong instability for short waves, whereas the two-layer model and the continuous 2½-dimensional model seem to describe almost correctly the behaviour of waves in a baroclinic current. *Subject Headings:* **1. Atmospheric circulation 2. Atmospheric models 3. Numerical forecasting.**—*Author's abstract.*

4.6–98 551.511

Hinkelmann, K. (*Bad Kissingen*), **Der Mechanismus des meteorologischen Lärmes.** [Mechanism of meteorological "noise."] *Tellus*, 3(4):283–296, Nov. 1951. fig., 3 tables, 3 refs., eqs. English summary p. 283. **MH-BH**—Short period oscillations about a trend of meteorological elements, propagating approximately with the velocity of sound, are called "meteorological noise." The author uses simplified differential equations for a homogeneous atmosphere in his detailed study, derives amplitudes and duration of these oscillations and comes to the conclusion that the "noise" phenomena depend on the initial field of the non-geostrophic wind components. *Subject Headings:* **1. Meteorological noise 2. Short period oscillations.**—*A.A.*

4.6–99 551.511:551.515

James, R. W., **Note on the motion of atmospheric vortices.** *Journal of Meteorology*, 9(6):447–448, Dec. 1952. 4 eqs. **MH-BH**—In opposition to C.-G. Rossby (*Journal of Meteorology* 6:163, 1949), author finds that a gradient-wind circular vortex is not subject to forces depending on the change of Coriolis parameter with latitude. *Subject Heading:* **1. Dynamics of the atmosphere.**—*C.E.P.B.*

4.6–100 551.511

van Mieghem, Jacques, **Grossräumige Energieumsetzungen in der Atmosphäre.** [Large-scale energy transformations in the atmosphere.] *Annalen der Meteorologie*, 5(6):169–174, 1952. 19 refs. 15 eqs. German and English summaries p. 169. **DWB**—From the equations of energy of unaveraged atmospheric motion and the first law of thermodynamics, the corresponding equations for mean zonal motion and large scale turbulence are deduced. Applying these energy equations to large atmospheric disturbances, it is shown that the two most important energy transformations on the scale of the general circulation are the conversion of potential energy into kinetic energy of large-scale eddies and the conversion of this last into kinetic energy of the zonally averaged motion. *Subject Heading:* **1. Energy transformation.**—*From author's abstract.*

GENERAL CIRCULATION

See also: **Mean field of atmos. motion** (Mintz, Dean), 4.6–9; **Wind field of middle lat.** (Johnson), 4.6–151; **Presistence in climatic anomalies** (Namias), 4.6–228.

4.6–101 551.513:551.588.2

Flohn, Hermann, **Hochgebirge und allgemeine Zirkulation. II. Die Gebirge als Wärmequellen.** [High mountains and general circulation. 2. The mountains as heat sources.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 5(3):265–279, 1953. 3 figs., 2 tables, 34 refs. German, English, French summaries p. 265–266. **DWB**—A section along 55°N shows a marked increase of upper troughs to E. of American and E. Asian mountains and of ridges to W. of Rocky Mountains and on American E. Coast. A similar effect is shown by mean height of 500 mb surface. This is due to thermal as well as dynamic factors. In summer inward radiation increases with height more rapidly than outward and thermal upper highs lie over high plateaus. Over Tibet temperature at 5–6 km is highest anywhere, causing a rise of absolute topography by 40 gpm. A second heat source, yearlong but greatest in

winter, is condensation to windward of mountains, with a reverse effect to leeward. These two effects cause anticyclonic curvature over mountains and with other factors induce instability in jet streams. *Subject Headings:* **1. Atmospheric circulation 2. Orographic influences.**—*C.E.P.B.*

4.6–102 551.513:532.527

Hide, R., **Some experiments on thermal convection in a rotating liquid.** *Royal Meteorological Society, Quarterly Journal*, 79(339):161, Jan. **1953. DWB**—Flow of water between two rotating cylinders at different temperatures on a common vertical axis showed striking similarities to general atmospheric circulation. *Subject Headings:* **1. Atmospheric circulation 2. Hydrodynamics.**—*C.E.P.B.*

4.6–103 551.513.1:519.241.1

Dedebant, G. and Di Maio, R., **Isocorrelacion barica applicada a la Republica Argentina.** [Barometric isocorrelation applied to Argentina.] *Meteoros*, 2(1/2):25–49, Jan./June **1952.** 10 figs., eqs. **DWB**—The theory of barometric isocorrelation is worked out at great length and charts of isocorrelation for 100 stations in South America (mostly Argentina) with relation to basic data for San Pedro, Chile constructed for July 1942 with $H=0$ hours, 24, 48, 72 and 96 hours time lapse. A marked regularity in movement of the areas of high correlation, partly conforming to the westerly circulation and partly to the orographic effect of the Andes, appears on these charts. The author suggests extending this study to other parts of the earth with similar orography with respect to the general circulation, to verify tentative conclusions. *Subject Headings:* **1. Autocorrelation of pressure 2. Pressure correlations 3. San Pedro, Chile 4. Argentina.**—*M.R*

4.6–104 551.513.2:551.557:551.515

Ramage, C. S., **Relationship of general circulation to normal weather over southern Asia and the western Pacific during the cool season.** *Journal of Meteorology*, 9(6):403–408, Dec. **1952.** 7 figs., 19 refs. **MH-BH**—A jet stream at 500 mb lies S of Himalayas (25–30 N) Oct.–April. Attributed to lifting of air from NW and resulting temperature gradient, and effect of snow cover on insolation. Along this jet extratropical depressions form and move, and cold fronts intensify, and the jet concides with axis of maximum rainfall. S of jet stream is a zone of subsidence. In 17–24°N, 90–150°E convergence leads to intensified jet, subsidence and drought. The subtropical ridge is displaced northwards. The occurrence of winter cyclones east of Philippines and over SW Bay of Bengal is related to these developments. *Subject Headings:* **1. Jet stream 2. Atmospheric disturbances 3. Southeast Asia.**—*C.E.P.B.*

ATMOSPHERIC DISTURBANCES

See also: **Forecasting depression tracks** (Müller-Annen), 4.6–63; **Motion of atmos. vortices** (James), 4.6–99; **Relation: general circulation—normal weather over S. Asia and W. Pacific in cool season** (Ramage), 4.6–104; **Atmos. radioactivity after nuclear explosion** (U. S. Office of Naval Research, London), 4.6–242; **Lightning location by azimuth and distance of lightning strokes** (Feteris), 4.6–243.

4.6–105 551.515.4(42)

Finch, C. R., **Heavy thunderstorm in London.** *Weather*, 7(11):355, Nov. **1952. MH-BH**—Account of storm of May 19, 1952. *Subject Headings:* **1. Thunderstorms 2. London, England.**—*C.E.P.B.*

4.6–106 551.515.4:551.576.1(09)

McCaffery, W. D. S., **An eighteenth century account of cumulonimbus clouds.** *Weather*, 7(9):266–268, Sept. **1952. DWB**—Extract from J. PRIESTLEY: "The history and present state of electricity, with original experiments" (1775), describing a thunderstorm observed by BECCARIA. *Subject Headings:* **1. Cumulonimbus clouds. I. Priestley, J. II. Beccaria, Giacomo Battista.**—*C.E.P.B.*

4.6–107 551.515.4:551.551

Page, David, **Salt mine in the sky.** *Air Facts*, New York, 15(10):7–14, Oct. **1952. DWB**—A vivid description of a thunderstorm situation encountered by a private pilot flying from Charlotte, N. C. to Cleveland. Extremely heavy turbulence was experienced at first while in a thunderstorm updraft. Then the plane broke out into an area between two cloud layers, with pillars of cloud connecting the two layers like pillars of salt in a salt mine. *Subject Headings:* **1. Thunderstorm turbulence 2. Cloud formations.**—*M.R.*

4.6–108 551.515.4(753)

Potter, John Allen (*Takoma Park, Md.*), **A report on a thunderstorm survey during the season, 1951.** Washington, D. C., [1952?] 10 p. 3 figs. Manuscript. **DWB**—An amateur analysis of local rainfall patterns during 14 out of 20–25 thunderstorms which passed over the District of Columbia during April–Oct. 1951. Several maps of the District and surroundings show location of cooperative rainfall stations and isohyets for individual storms and types of storms as well as for the mean of those observed. Average wind temperature (dry and wet), relative humidity, dew point, movement of storm (speed and direction), time of day, duration and structure of storm are mentioned in analysis. *Subject Headings:* **1. Thunderstorm surveys 2. Cooperative observers 3. District of Columbia area.**—*M.R.*

4.6–109 551.515.4(595)

Rackliff, P. G., **Thunderstorm of November 19, 1950, at Singapore.** *Meteorological Magazine*, London, 81(966):379–380, Dec. **1952.** fig., table. **MH-BH**—Description with barogram of storm associated with intertropical convergence line which gave 110 mm rain in 3 hours. *Subject Headings:* **1. Thunderstorms 2. Singapore.**—*C.E.P.B.*

4.6–110 551.515.4:551.577.37

§Smith, C. G., **Heavy thunderstorm at Oxford.** *Weather*, 7(6):163–169, June **1952.** figs. **DWB**—Account of a thunderstorm around Oxford (Eng.), Sept. 7, 1951, with rainfalls of 3.34 in. (2.62 in 86 min.) at Oxford and 3.45 in. at Eaton to WSW. The storm occurred in a cold front. Considerable damage was done. *Subject Headings:* **1. Thunderstorms 2. Rainstorms.**—*C.E.P.B.*

4.6–111 551.515.42(435)

Menzl, Oswald, **Die Gewitter im böhmischen Mittelgebirge.** [Thunderstorms in the Bohemian Mittelgebirge.] *Meteorologische Rundschau*, 5(7/8):134–135, July/Aug., **1952.** fig., 3 tables, 5 refs. **DWB**—Frequencies of thunder on Donnersberg 1906–35 are summarized (annual and diurnal variation) and related to wind direction (most frequent with W winds, least with SE). *Subject Headings:* **1. Thunderstorm frequencies 2. Donnersberg, Czechoslovakia.**—*C.E.P.B.*

4.6–112 551.515.7:550.384.4

Sparkman, J. W., Jr., **Geomagnetic conditions and anticyclonic development.** *American Meteorological Society, Bulletin*, 32(8):282–288, Oct. **1951.** 10 figs., 5 refs., eqs. **MH-BH**—Report on 5 simple tests based on a statistical method of determining the correlation between geomagnetic changes and changes in pressure. Investigation of 189 cases indicated a definite relationship, especially between horizontal intensity values obtained immediately after sunrise and anticyclone development 36–48 hours later. Results of the tests are presented in graphs. It is suggested that the use of geomagnetic elements, other than the horizontal intensity investigated in these tests, would contribute to establishing the correlation in a more complete way. *Subject Headings:* **1. Geomagnetic variations 2. Anticyclogenesis.**—*G.T.*

4.6–113 551.515.71

§Sutcliffe, Reginald Cockroft, **The formation of new anticyclones.** *Great Britain. Meteorological Research Committee, M.R.P.* 755, Sept. 20, **1952.** 10 p. 7 figs., table, 7 refs. Mimeographed. Rev. version in: *Meteorological Magazine*, London, 82 (972): 163–175, June

1953. **DWB**—In Atlantic and W. Europe, 42 new anticyclones were classified by 500 m contour and 1000–500 mb thickness into 4 types—simple sinusoidal oscillation with and without pre-existing high to the south, anticyclonic wave disruption and complex types. Examples are illustrated and discussed. The upper air pattern however lead to development of ridges from pre-existing high pressure centers much more often than to closed new highs, and this problem is discussed. *Subject Heading:* **1. Anticyclogenesis.**—*C.E.P.B.*

4.6–114 551.515.3

Faust, Heinrich, **Maskierte Warmfronten.** [Masked warm fronts.] *Meteorologische Rundschau*, 5(5–6):93–95, May–June, **1952.** 3 figs., 3 refs. **MH-BH**—A masked warm front is one in which the advancing warm air has a strong ground inversion. Examples of 2 types were over Scandinavia July 8 (regional type) and N. Germany July 10, 1949 (diurnal type). *Subject Heading:* **1. Warm fronts.**—*C.E.P.B.*

4.6–115 551.515.8(4)(261)

*Fontaine, P., **Les "gouttes d'air froid" sur l'Europe, la Méditerranée et l'Atlantique Est** ["Cold air bubbles" over Europe, the Mediterranean and the East Atlantic.] *La Météorologie*, 4th Ser., No. 22:98–112, April/June **1951.** 8 figs., tables, append. French, English and Spanish summaries p. 98. **DWB**—A statistical-synoptic study, based on 4 years of French daily weather maps, of the frequency (and attending weather conditions) of cold air bubbles (cold lows or Kaltlufttropfen) over Western Europe (C), the Eastern Atlantic (A) and Western Mediterranean (M), monthly frequency and direction of movement (trajectories) are shown on charts, and the seasonal frequency in the 3 sectors (C, A and M) is shown in tables and graphs. Also attempt is made to correlate with Zurich sunspot numbers. Classified according to 4 sources: Greenland, Iceland, Scandinavia and Continental and statistics given by seasons of frequency of 4 types over the 3 sectors, and in each of the 4 years number of days with thunderstorms or hail correlated with seasonal frequency of cold aid "bubbles" in each sector showing evidence of relation to Scandinavian type air mass for hail, and to all such "bubbles" for thunderstorms. However, length of record not enough for a true synoptic climatological analysis. *Subject Headings:* **1. Air mass climatology 2. Cold air bubbles 3. Thunderstorm frequencies 4. Hail frequencies 5. France.**—*M.R.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Photocell amplifier for infrared spectroscopy** (Brown), 4.6–51; **Apparatus for infrared spectroscopy** (Lippert), 4.6–52; **Ionospheric thermal radiation at radio frequencies** (Pawsey, McCready, Gardner), 4.6–83; **Everyday radiation** (Cowan), 4.6–214.

4.6–116 551.521.1:551.509.3

Abbott, Charles G. (*Smithsonian Inst.*), **What causes weather?** *Astronomical Society of the Pacific, San Francisco, Leaflet*, No. 254, May **1950.** 7 p. 2 figs. **DLC**—In opposition to the popular view that weather, which is the totality of departures from regularity in climate, depends mainly on complexities of the earth, the author declares that weather is caused by variations in solar radiation. He briefly describes the extensive work of solar measurement carried on by the Smithsonian Institution. The author finally reports his own investigation of the correlation between solar activity and precipitation at Peoria, Ill. In this investigation, precipitation data from 1856 to 1930 were worked over as many as six times and compared with 22 periodicities found in solar measurement. Conclusions reached in this comparison were used for experimental forecasts. The theoretical forecasts made for 1940 through 1942 show an 81% accuracy, whereas those prepared for 1943 and 1944 (years of sunspot minimum) proved to be failures, thus reducing total accuracy for the 72-month period to 61%. The author is confident, however, that he will be able to improve on these results. *Subject Headings:* **1. Radiation research 2. Solar radiation effects 3. Correlations 4. Periodicities 5. Forecasting techniques. I. Smithsonian Institution.**—*G.T.*

4.6–117 551.521:523.77:535.33

Adel, Arthur (*Ariz. State Col., Flagstaff*), **The atmospheric window, 16 to 24 microns, and e second fundamental of nitrous oxide.** Arizona. State College, Flagstaff, Contract F 19(122)-198, Scientific Report HA-3, March 10, **1952.** 8 p. 3 figs., 7 refs. Also: *Physical eview*, 2nd Ser., 88(1):128, Oct. 1, **1952. DWB**—Describes the characteristics of the new indow from a meteorological point of view. The P, Q, and R branches of the atmospheric trous oxide band are indicated in the solar-telluric spectrum obtained through 1 mm pre- pitable water as featured in the accompanying illustration. All three fundamentals are now cated: V_1 at 7.8, V_2 at 17.0 and V_3 at 4.5 microns. *Subject Headings:* **1. Solar spectrum Nitrogen bands 3. Radiation research. I. Arizona. State College, Flagstaff II. Contract F 19(122)-198.**—*W.N.*

4.6–118 551.521.1:581.055:582.47

Curry, John R. and Church, Thomas W., Jr. (*Paul Smiths, N. Y.*), **Observations on winter ying of conifers in the Adirondacks.** *Journal of Forestry*, 50(2):114–116, Feb. **1952.** 5 figs. **LC**—Heavy winter damage occurred during 1947/48 in New York State especially to trees posed to solar radiation. The winter was exceptionally cold with great daily fluctuations in mperature. The authors believe that the cause of injury was winter drying. The most nsitive was red spruce; white pine and hemlock recovered rapidly. *Subject Headings:* **Radiation effects 2. Forests 3. Winter injuries to forests 4. New York.**—*A.A.*

4.6–119 551.521.1

Schieldrup, Paulsen, H., **Global radiation in Bergen.** *Bergen. Universitetet. Årbok, 952, Naturvitenskapelig Rekke*, No. 9, **1952.** 28 p. 10 figs., tables, 18 refs. **DLC**—An alysis of global radiation recorded in Bergen with a Robitzsch actinograph during the period 945–1950. The calibration of the instrument is discussed. "The records were evaluated by etermining the mean hourly deflection of the recorded curve, centered on the whole hours of ue solar time," so that the mean daily variation of the radiation could be given. The scussion covers the annual variation of the global radiation; the diurnal variation of the obal radiation in Bergen (1945–50) (gcal cm^{-2} min^{-1}) is included. *Subject Headings:* **1. Global diation 2. Robitzsch actinograph 3. Bergen, Norway.**—*I.L.D.*

4.6–120 551.521.13

†Georgi, Johannes, **Solarkonstante und meteorologische Strahlungsmessung.** [Solar nstant and meteorological radiation measurement.] *Annalen der Meteorologie*, 5(3/5):83–, **1952.** 3 tables, 26 refs. **MH-BH**—Discusses historically the UV and infrared corrections the measured solar constant. The most probable "astrophysical" value (0-infinity) is 94 cal/cm^2/min, but for meteorological purposes only radiation between 0.346 and 2.4 is nportant, and for this a S.C. of 1.80 is appropriate. Spectral distribution tabulated. The riable ozone layer causes changes in this "meteorological" S.C. Finally, various technical oblems on the measurement of the S.C. are discussed. *Subject Heading:* **1. Solar constant.**—*E.P.B.*

4.6–121 551.521.14

Sivkov, S. I., **Geograficheskoe raspredelenie effektivnykh velichin al'bedo vodnoĭ pov- khnosti.** [Geographical distribution of the effective magnitudes of the albedo of water rfaces.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Izvestiia*, 84(2):200–201, March/April **952.** table, 2 refs. **DLC**—In order to calculate the effective albedo which would give not stantaneous values but daily totals of the relationship between indirect and reflected radiation ver a water surface, P. P. Kuz'min proposed to consider the albedo of water surfaces as a nction of the height of the sun at true noon. A table giving the annual course of the effective bedo (in percentage) of a water surface for all latitudes from 0 to 90° in 5° class intervals is resented. Equations for calculating radiation balance with the aid of this albedo are $S_r' = A_s \cdot \Sigma S_o'$ and $\Sigma S_a' = (1 - A_s) \cdot \Sigma S_o'$ where S_r' is monthly total of reflection from water, S_a' is total monthly incident radiation, $\Sigma S_o'$ is radiation absorbed by water surface, A_s— bedo. *Subject Heading:* **1. Albedo of water surfaces.**—*I.L.D.*

4.6–122 551.521.16:551.508.9

Koch, W. and Kaplan, D. (*The Hebrew Univ., Jerusalem*), **An objective method for measuring the daylight factor.** *Journal of Scientific Instruments*, 29(6):179–180, June 1952. 3 figs. 4 refs. **DLC**—Illumination on a roof varies from 5 to as much as 300 times as much as in a room. The ratio is called the daylight factor, and it was previously measured by having two observers make simultaneous readings outdoors and in. The present system involves exposure of two cells (with precautions and modifications for varying exposure conditions outdoors and in) connected by a bridge, light from the whole sky must be measured and temperature effects minimized outdoors so the shield is much more complicated than for indoors: a covering consisting of a hollow hemisphere of brass, nickel plated on the outside and covered with lamp black inside, with holes of known size all over to admit light. Where light outdoors is weak a braided sieve may be used instead, with a transmission as high as 70%. Housings of photocells are described and illustrated, wiring circuits shown and use of equipment described. By use of the bridge, the daylight factor at any point in a room can be determined by one observer. This daylight factor remains constant at all times, so lines of equal daylight illumination within a room can be drawn if enough readings are taken in the room. Direct illumination readings can be obtained by disconnecting the bridge. *Subject Headings:* **1. Illumination meters 2. Daylight factor measurements.**—*M.R.*

4.6–123 551.521.13

Aldrich, L. B. and Hoover, W. H. (*Astro. Obs., Smithsonian Inst.*), **The solar constant** *Science*, 116(3024):3, Dec. 12, **1952. DLC**—The mean value of thousands of solar constant measurements made by the Smithsonian Institution is 1,946 langleys. The record shows a small irregular variation rarely exceeding a range of 2% with a gradual trend towards larger values. The probable absolute value of the solar constant based upon this mean is determined by three factors: 1) the original arbitrary scale of radiation is 1.8 percent below the standard scale adopted by the Smithsonian Institution in 1913; 2) the correct scale of radiation is 2.4% below the 1913 scale and 3) a correction of +0.6% for larger ultraviolet and infrared wave lengths. The application of +1.8%, −2.4% and 0.6% gives a mean value of 1.94 langleys. *Subject Heading:* **1. Solar constant.**—*I.L.D.*

4.6–124 551.521.3

Collmann, Wolfgang, **Einige Korrekturen für LINKES Unterlagen zur Bestimmung des Trübungsfaktors.** [Some corrections to Linke's fundamental theory for the determination of the turbidity factor.] *Annalen der Meteorologie*, 4(10–12):485–487, **1951. DWB**—Several corrections to tables in *Meteorologisches Taschenbuch*, v. 4, and *Handbuch der Geophysik*, v. 8 are given. *Subject Heading:* **1. Turbidity.**—*C.E.P.B.*

4.6–125 551.521.3

Lönnqvist, Olov, **Calculating effective radiation with due regard to its diffuse nature.** *Arkiv för Geofysik*, Stockholm, 1(15):441–451, **1951.** 2 figs., 2 tables, 14 eqs. **MH-BH**—Continuing his work "A general method and a simplified formula for calculating effective radiation" (*ibid.*, 1(4):79–115, 1950), author presents a new corrected formula on the assumption that radiation may travel in all directions. The problem of finding the factor by which the absorption coefficients must be multiplied (on the assumption of purely vertical radiation) is discussed, and, since this factor varies with the temperature lapse, the value 1.65 is but a good approximation. *Subject Headings:* **1. Radiation calculations 2. Diffuse radiation 3. Stockholm, Sweden.**—*W.N.*

4.6–126 551.521.3:551.521.61

Plass, Gilbert N., **Parallel-beam and diffuse radiation in the atmosphere.** *Journal of Meteorology*, 9(6):429–436, Dec. **1952.** 10 refs., 35 eqs. **MH-BH**—The first part sets out a method of calculating transmission functions for infrared lines, taking account of pressure broadening and variation of fractional concentration of radiating gas with height. This allows calculation of radiation exchange between two atmospheric layers under various conditions.

Pt. 2 shows that the factor for converting parallel beam to diffuse radiation is not uniformly 1.66 but varies from 2 for frequency interval with weak lines to nearly 1 for very strong overlapping lines. *Subject Headings:* **1. Transmission coefficients 2. Infrared radiation.**—*C.E.P.B.*

4.6–127 551.521.3

Yamamoto, Gi-ichi and Onishi, Gaishi, **Absorption of solar radiation by water vapor in the atmosphere.** *Journal of Meteorology*, 9(6):415–421, Dec. **1952.** 8 figs., table, 17 refs., 13 eqs. **MH-BH**—Using FOWLE's observations and ELSASSER's formula for absorption of a band spectrum, curves of relation to precipitable water are obtained and compared with those of other authors. A chart is calculated for finding absorption of solar radiation by an air column and rate of heating of the air, and is used to find mean absorption and heating in 0–10 and 10–20°N. With minor differences these agree with those of J. LONDON (1951). *Subject Heading:* **1. Absorption by water vapor.**—*C.E.P.B.*

4.6–128 551.521.7

†Laffineur, M., **Évolution des théories du rayonnement électromagnétique solaire aux fréquences radioélectriques.** [Evolution of theories of electromagnetic solar radiation at radio-electric frequencies.] *Commission pour l'Étude des Relations entre les Phénomènes Solaires et Terrestres, Rapport* 7:77–86, **1951.** 42 refs., eq. **DWB**—Summarizes with references, theories since 1942, including radiation of charged particles, thermal radiation of different types, and oscillations of an electron gas (plasma) which may be directed by electric or magnetic fields. *Subject Heading:* **1. Solar radiation.**—*C.E.P.B.*

TEMPERATURE

See also: **"Accumulated temp. rule" investigations** (Schrödter), 4.6–39; **Velocity, temp. and humidity profiles, lower atmos.** (Björgum), 4.6–95; **Cooling power** (Thams), 4.6–219; **Biometeorological heat effects** (Wachter), 4.6–221.

4.6–129 551.524.4 551.571.4

*Best, Alfred Charles; Knighting, Ernest; Pedlow, R. H. and Stormonth, K., **Temperature and humidity gradients in the first 100 m. over southeast England.** *Great Britain. Meteorological Office. Geophysical Memoirs*, 11(89), **1952.** 60 p. 18 figs., 27 tables, 2 refs. M.O. 530d. **DWB**—In this very detailed memoir, temperature and relative humidity at Rye, Sussex (flat ground near sea) are recorded in 1945–1948 at 1.1, 15.2, 47.2 and 106.7 m above ground, with wind at 12.7 m, sunshine and starshine. The site and instrumental setup are described and illustrated. Diurnal and annual variations at various heights and gradients between them are shown in tables and graphs, also comparisons of clear and overcast days and frequency distributions of different lapse rates of temperature and humidity. The effect of snow cover is discussed. Finally, the temperature and humidity structure of a radiation fog, and the sequence of events in its development and dissipation are summarized. *Subject Headings:* **1. Vertical temperature gradient 2. Humidity lapse rate 3. Radiation fog 4. Rye, Sussex, England.**—*C.E.P.B.*

4.6–130 551.524.4:551.525.4

*Ward, W. C., **Temperature measurements from 10 feet above to 10 feet below the earth's surface.** *U. S. Naval Ordnance Test Station, NOTS*, TM 243, April 1, **1952.** 7 p. 8 figs., 2 tables, 6 refs. **DWB**—During July 1947 to June 1948, measurements were made at Armitage Field, Calif., at several fixed hours in the morning and afternoon to determine the variability of temperature in the microclimatic layer and to a depth of 10 feet in soil, and under sand, asphalt and concrete. Thermocouples were installed at depths of 6″, 12″, 3′ and 10′ and shelter temperatures were taken at 2″, 2′, 4′, 6′, 8′ and 10′ above the soil. Results are shown in tables and comparatively on graphs. Measurements were made to depths of 5 ft during the last half of 1948 and in 1949. *Subject Headings:* **1. Air-soil temperature data 2. Soil temperatures 3. Armitage Field, Calif.**—*M.R.*

4.6–131 551.524.7:551.547

Dewar, D., **Charts of upper air temperature and isobaric height.** *Meteorological Magazine*, London, 82(967):1–10, Jan. **1953.** 7 figs., 2 refs. **MH-BH**—World maps (Mercator and polar) are now drawn monthly in British Meteorological Office for mean heights and temperatures of standard pressure levels. Examples are reproduced and discussed. *Subject Headings:* **1. Upper air pressure 2. Upper air temperatures.**—*C.E.P.B.*

4.6–132 551.524.7

Kellog, William Welch (*The Rand Corp., Santa Monica, Calif.*), **Temperatures and motions of the upper atmosphere.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 54–74. 5 figs., 49 refs.) **DLC**—The various techniques which have yielded knowledge of upper atmospheric temperatures and winds are described briefly and some of the results obtained are presented. These techniques are rockets, high level balloons, sound propagation, radio wave propagation, meteor observations, noctilucent clouds, airglow and aurora, ozone concentration studies, tidal oscillations, dynamo theory and radiation heat exchange. Seasonal change of upper atmospheric temperatures, temperature versus height relationships, wind velocities and the general circulation in the upper atmosphere below 120 km are discussed. *Subject Headings:* **1. Upper air temperatures 2. Upper air temperature measurement.**—*I.L.D.*

4.6–133 551.524.7

Lina, Lindsay John and Ricker, Harry H., Jr. (*Langley Aeronautical Lab., Langley Field, Va.*), **Measurements of temperature variations in the atmosphere near the tropopause with reference to airspeed calibration by the temperature method.** *U. S. NACA, Technical Note*, 2807, Oct. **1952.** 23 p. 6 figs., table, eqs. **DWB**—Measurements of temperature variations in the atmosphere near the tropopause over land in the vicinity of Langley Field, Va., are presented. This investigation was made for the purpose of obtaining information on the accuracy of the temperature method (*NACA TN* 2046) of airspeed calibration over the range of Mach number from 0.6 to 0.8. The temperature surveys and the description of a specially designed thermometer are also presented. *Subject Headings:* **1. Upper air temperature variations 2. Tropopause 3. Instrument calibration.**—*Authors' abstract.*

4.6–134 551.524.7:551.510.53

Scrase, F. J., **Relatively high stratosphere temperature of February 1951.** *Meteorological Magazine*, London, 82(967):15–18, Jan. **1953.** 2 figs., 4 refs. **MH-BH**—On Feb. 5–20, 1951, temperatures at Downham Market, Eng., at 18–30 km were abnormally high, culminating on Feb. 12 (40°F higher at 30 km than outside the period). On Feb. 1–12 an easterly air stream was found above 18 km but no relation was found with solar phenomena, daily range of vertical magnetic force or ionospheric phenomena. *Subject Headings:* **1. Temperature of the stratosphere 2. Downham Market, Eng.**—*C.E.P.B.*

SOIL TEMPERATURES

See also: **Temp. measurements 10 ft above, 10 ft below surface** (Ward), 4.6–130; **Water in frozen soil** (Dadykin), 4.6–190.

4.6–135 551.525.4

*Hautfenne, M., **Une année d'enregistrement continu de la température du sol.** [One year of continuous measurements of soil temperature.] *Belgium. Institut Royal Météorologique, Mémoires*, v. 50, **1952.** 83 p. 49 figs., append. **DWB**—Results of observations, made in Uccle, Belgium given for 1949 (soil temperature for the depths 100, 50, 20, 10 and 1 cm under grass cover, 1 cm under bare soil, air temperature, solar and sky radiation). Ten-day and monthly averages are presented for the whole year, values for each 30 min for July only. The dependence of the temperature difference soil-air on the soil temperature is discussed. Graphical presentation for sample days shows the influence of short time variations in solar radiation. *Subject Headings:* **1. Soil temperatures 2. Solar radiation 3. Uccle, Belgium.** —*A.A.*

4.6–136 551.525.5(43)

*Aniol, Rudolf, **Die grössten Bodenfrosttiefen.** [The greatest depths of ground frost.] *Naturwissenschaftliche Rundschau*, 5(12):493–495, Dec. **1952.** table, 7 refs. **DWB**—A list of all available data of greatest depth of soil temperatures below 0°C in Germany (ranging up to 150 cm). *Subject Headings:* **1. Frozen soil 2. Soil temperature data 3. Germany.**—*C.E.P.B.*

SEA TEMPERATURES

4.6–137 551.526.6(268.2)

Krügler, Fritz, **Über extrem starke örtliche Schwankungen der Wasseroberflächentemperatur in Eisnähe am Rande des Ostgrönlandstroms.** (**Kurzbericht über maritim-meteorologische Beobachtungen in der Dänemarkstrasse.**) [On extreme local variations of sea surface temperature near the ice on the edge of the East Greenland current (Summary of maritime meteorological observations in Denmark Strait.).] *Annalen der Meteorologie*, 5(6):185–188, **1952.** 6 figs., table, 2 refs. German and English summaries p. 185. **DWB**—On June 25, 1952, a close series of air and sea temperature observations was made near ice edge between Greenland and Iceland, showing variations up to 6°C in 3 miles. These are interpreted as streaks due to eddies between East Greenland and Irminger Currents. Air temperature at 7.5 m above sea responded in about 10 min but at 16.5 m there was little change. Similar variations were found on June 27. *Subject Headings:* **1. Sea surface temperatures 2. Denmark Strait.**—*C.E.P.B.*

4.6–138 551.526.8:551.482

*Dussart, Bernard and Suchet, Marysette, **Influence du Rhone sur l'état thermique du Lac Léman.** [Effect of the Rhone River on thermal conditions in the Lake of Geneva.] *Académie des Sciences, Paris, Comptes Rendus*, 235(15):806–808, Oct. 13, **1952.** tables. **DWB**—Simultaneous measurements of water temperature at two extreme points of the Lake of Geneva at one-hour intervals for ten hours for every meter down to 40 m and every 10 meters below that depth were made in May 1952. Data on the depth at which temperature values ranging from 6 to 16°C (at one-degree intervals) were obtained each hour are tabulated for both sites. The results appear to refute the opinion that the water of the Rhone flows down to the lake's bottom or rapidly mixes with the lake's water. It is found, on the contrary, that such mixing occurs in the lake's surface water only, and water supplied by the river stagnates at a depth of 15–25 m. A comparison of variation in river flow and in lake temperature confirms the correctness of this statement. *Subject Headings:* **1. Lake temperatures 2. River water temperature influences 3. Rhone River 4. Lake of Geneva.**—*G.T.*

4.6–139 551.526.8:551.311.182

Vadilo, P. S., **Struktura l'da ledianogo pokrova rek.** [The structure of the ice constituting the ice cover of rivers.] *Priroda*, Moscow, 40(3):52–53, March **1951.** 2 refs. **DLC**—The thawing of ice depends upon its structure and the process begins in a layer of individual microscopic crystals with polished faces that forms on the ice in the presence of warmer air. The formations of such layers of ice crystals of thicknesses of 1–1.5 cm and even 10–30 cm on the lower surface of river ice and the properties of the crystals are described. *Subject Headings:* **1. Ice mechanics 2. River ice structure 3. U.S.S.R.**—*I.L.D.*

TURBULENCE AND WIND

TURBULENCE

See also: **Mean field of atmos. motion** (Mintz, Dean), 4.6–9; **Velocity, temp. and humidity profiles in lower atmos.** (Björgum), 4.6–95; **Salt mine in sky** (Page), 4.6–107; **Coefficient of variability of monsoon rain, India, Pakistan** (Naqvi), 4.6–173.

4.6–140 551.551:551.557:656.7

Arakawa, Hidetoshi, **Clear-air turbulence near the jet stream.** *Royal Meteorological Society, Quarterly Journal*, 79(339):162–163, Jan. **1953.** table, 6 refs., eq. **DWB**—Criterion

of cyclonic shear for turbulent motion in zonal flow is $-\frac{\partial u}{\partial y}=\omega \sin \phi+\frac{2u}{R} \tan \phi$ where u = zonal wind. Values are given for $\phi = 50-65$, u up to 115 kt. *Subject Heading:* **1. Clear air turbulence.**—*C.E.P.B.*

4.6–141 551.551:533.17

Heinrich, G., **Der Energietransport in strömenden Medien.** [Energy transport in flowing media.] *Zeitschrift für angewandte Mathematik und Mechanik*, 32(8/9):286–288, Aug./Sept., **1952.** 20 eq. **DLC**—An energy transport vector is deduced for frictionless incompressible flow, and extended to a viscous compressible medium. *Subject Heading:* **1. Turbulent flow.**—*C.E.P.B.*

SPECIAL WINDS

See also: **Aerology of Mendoza** (Georgii), 4.6–225.

4.6–142 551.555.3

§Hoinkes, Herfried, **Über Nordföhnerscheinungen nördlich des Alpenhauptkammes. I. Mitteilung: Der kurze Nordföhn vom 28. September 1940.** [North föhn phenomena northwards from the main ridge of the Alps. I. Communication: The brief north föhn on September 20, 1940.] *Akademie der Wissenschaften, Vienna, Math.-naturw. Klasse, Sitzungsberichte, Abt. IIa*, 160(6/10):267–290, **1951.** 13 figs., 14 refs. **DWB**—Description of local peculiarity of this rare occurrence (65 cases in 30 years). The seasonal and diurnal frequency is shown and one case analyzed in a more detailed manner with graphs of meteorological elements and 500 mb level isobars showing the general synoptic situation (down sliding of maritime tropical air on a polar front surface). *Subject Headings:* **1. Föhn winds 2. Innsbruck, Austria 3. Alps.**—*A.A.*

4.6–143 551.555.3

Schweitzer, H., **Versuch einer Erklärung des Föhns als Luftströmung mit überkritischer Geschwindigkeit.** [Attempts to explain the föhn as an air flow with hypercritical velocity.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 5(3):350–371, **1953.** 5 figs., table, 24 refs., 22 eqs. German, English, French summaries p. 350–351. **DWB**—To explain observation that a warm föhn can descend through colder air, and other peculiarities, an analogy is developed between water "shooting" with hypercritical velocity (Froude No. >1) in a shallow open channel and the föhn between an upper inversion and the ground or a stagnant cold layer. Analysis is then extended to flow over an obstacle and the transition from a channel to a 2-layer atmosphere discussed. The critical velocities for different heights and intensities of the inversion are calculated; their range (6.7 to 63 m.p.h.) includes those found in nature, so that the proposed mechanical explanation, combined with suction effect of a low north of Alps, appears to be adequate. *Subject Heading:* **1. Föhn theory.**—*C.E.P.B.*

4.6–144 551.555.8

Fleming, J., **Sandstorms in the Sudan.** *Meteorological Magazine*, London, 82(967):26–27, Jan. **1953.** 2 photos, 2 refs. **MH-BH**—Notes on initiation of blowing sand in haboobs. *Subject Headings:* **1. Haboobs 2. Sudan.**—*C.E.P.B.*

4.6–145 551.555.8

Sandstorm at Aden. *Indian Journal of Meteorology and Geophysics*, 3(1):39–40, Jan. **1952.** fig. **DWB**—A barograph chart of the sandstorm of Aug. 19, 1952 is presented and the wind regime associated with the storm is described. This storm was unusual because it occurred in the early afternoon while at this time of the year such storms occur mostly at night. *Subject Headings:* **1. Sandstorms 2. Aden, Arabia.**—*I.L.D.*

4.6–146 551.555.8

Warn, G. Frederick (*Texas Technological Col.*), **Some dust storm conditions of the Southern High Plains.** *American Meteorological Society. Bulletin*, 33(6):240–243, June **1952.** fig., table, 4 refs. **MH-BH**—A brief description of the topography and climate of the Southern

High Plains of Texas is given. On the basis of dust storm observations made in 1949 and 1950 the author discusses the role of diurnal winds, whirlwinds, thunderstorms and frontal winds in the causation of dust storms and proposes a classification of dust storm types in the Southern High Plains based upon intensity, direction, maximum horizontal wind speed, maximum height of dust above ground and horizontal visibility. The terms "dust lift," "dust swath" and "dust ring" are defined and a diagram showing blowing dust associated with a thunderstorm line is given. *Subject Headings:* **1. Dust storms 2. Definitions 3. Climate of Texas 4. Southern High Plains, Texas.**—*I.L.D.*

WIND EFFECTS

4.6–147 551.556:551.465

Darbyshire, J., **The generation of waves by wind.** *Royal Society of London, Proceedings, A*, 215(1122):299–328, Dec. 5, **1952.** 16 figs., 13 refs., 20 eqs. **DWB**—Spectra of wave trains on British coasts and Lough Neagh with fetch of 1–1000 miles were analyzed harmonically and compared with winds from isobaric charts. A number of relations between maximum wave height H_T (feet), wave period T (sec) and wind U (knots) are deduced, especially $H_T/T = 0.44 \exp\{-(T/U-\epsilon)^2/0.0027\}$ where $\epsilon = 0.24$ for fetch above 100 miles but decreases with decreasing fetch below 100 miles. Various expressions are given for wave steepness; in equilibrium (after 200–300 miles) steepness of highest waves is proportional to $1/\sqrt{U}$. The use of the results for prediction of waves and swell is illustrated and the theory of wave travel discussed. *Subject Heading:* **1. Wind wave propagation.**—*C.E.P.B.*

4.6–148 551.556:525.3

Munk, Walter and Groves, Gordon, **The effect of winds and ocean currents on the annua variation in latitude.** *Journal of Meteorology*, 9(6):385–396, Dec. **1952.** 3 figs., 4 tables, 14 refs., 22 eqs. **MH-BH**—Of the ellipse (mean diameter 20 ft) described annually by rotation pole of the earth, two thirds are due to the seasonal changes in pressure. Variation of angular momentum of geostrophic winds is of the right order but uncertain amount. The effect of surface winds is divided into skin friction (negligible or uncertain) and pressure against mountains. The pressure of monsoon winds against Himalayas is estimated to account for the remaining third of the observed wobble. *Subject Headings:* **1. Wind effects 2. Polar orbit.**—*C.E.P.B.*

4.6–149 551.556:551.465

Neumann, Gerhard, **Some problems concerning the dynamics of the Gulf Stream.** *New York Academy of Science, Transactions*, 14(7):283–291, May **1952.** figs., 16 refs., eqs. **DWB**—The author proposes a three dimensional analysis when trying to solve the quantitative change in the Gulf Stream related to the westward intensification of ocean currents and in tackling other problems such as the effect of wind stress. It is suggested that "the gliding-austausch along isentropic surfaces in the water probably plays an important part in explaining the observed flow pattern of the Gulf Stream and other similar currents." *Subject Headings:* **1. Oceanography 2. Wind driven currents 3. Gulf Stream 4. Atlantic Ocean.**—*M.P.K.*

4.6–150 551.556.3:621.311.24

Fellgett, P. B., **Generation of electricity by wind power.** *Polar Record*, 6(44):535–537, July **1952.** 3 refs. **DWB**—Summary of experiences in use of small wind generators especially in Arctic. *Subject Heading:* **1. Wind generators.**—*C.E.P.B.*

UPPER AIR WINDS

See also: **Mean field of atmos. motion** (Mintz, Dean), 4.6–9; **Relation: general circulation —normal weather over S. Asia and W. Pacific in cool season** (Ramage), 4.6–104; **Clear-air turbulence near jet stream** (Arakawa), 4.6–140; **Bibliography on stratospheric and ionospheric winds** (Evans), p. 733–754.

4.6–151 551.557:551.513.2

Johnson, D. H., **Further notes on the wind field of middle latitudes.** *Great Britain. Meteorological Research Committee, M.R.P.* 761, Oct. 29, **1952.** 5 p. 14 figs., 11 refs. Mimeographed. **DWB**—Structure of upper westerlies in Jan. 1950 is studied by daily cross sections

(1000–150 mb) from Greenland to Mediterranean and Azores to Baltic, with contours of 1000 and 300 mb surfaces over the whole area. All showed a central maximum of jet stream type near the tropopause. The summary for the month includes histograms of height (peak 300–325), mean velocity profiles and shear profile referred to center of jet mean cross section Angmagsalik-Tunis, etc. *Subject Headings:* **1. Upper air winds 2. Jet stream.**—*C.E.P.B.*

4.6–152 551.557:551.542.1:551.581

Jordan, Charles L., **A comparison between observed and geostrophic winds in low latitudes.** *Royal Meteorological Society, Quarterly Journal*, 79(339):153–156, Jan. **1953.** fig., 5 tables, 6 refs. **DWB**—Mean departures of actual from geostrophic wind speed were found (a) by comparing surface geostrophic with 2000 ft wind at 4 islands and (b) by comparing geostrophic with surface speed corrected for friction. The departures increase progressively from 30° to equator. *Subject Heading:* **1. Geostrophic winds.**—*C.E.P.B.*

4.6–153 551.557.3(42:262)

Durst, Charles Summer, **The relation between wind flow over British Isles and the Mediterranean.** *Great Britain. Meteorological Research Committee, M.R.P.* 776, Nov. 24, **1952.** 2 p. 2 tables. Mimeographed. **DWB**—Winds at 200 mb over Larkhill were correlated with those over Rome and Malta. Vector coefficients (−0.15 to −0.30) were significant at all seasons, possibly indicating a partial compensation in zonal flow. *Subject Headings:* **1. Upper air wind variations 2. England 3. Mediterranean.**—*C.E.P.B.*

4.6–154 551.557.36

§*Font Tullot, Inocencio (*Dir. Izana Obs. at Tenerife*), **La corriente aerea superior del NW. en Tenerife.** [Northwest upper air current at Tenerife.] *Revista de Geofísica*, Madrid, 11(42):156–172, April/June, **1952.** 10 figs., 3 tables, refs. **DWB**—In the present article the author analyzes the regime of prevailing winds aloft which are from the NW the whole year over Izaña Observatory (2367 m). They constitute 28% of the winds (49% of WNW and NNW are included) at the surface, with highest frequency in June (35% or 61% respectively), and for 4 synoptic hours are most frequent at 17h (69%). Interruptions in the normal WNW circulation are most frequent in spring (March–April) and autumn (Nov.–Dec.). Several types of anticyclones or depressions which interrupt this normal circulation are illustrated by simple sea level or 500 mb synoptic charts. (*See* 4E-170, May 1953, *MAB* for previous study.) *Subject Headings:* **1. Upper air winds 2. Upper air wind frequencies 3. Tenerife.**—*M.R.*

4.6–155 551.558

Smalley, Clarence L. (*U. S. Weather Bur., Forecast Center, San Bruno, Calif.*), **Unusual vertical air currents in the vicinity of Warm Springs, California, October 29, 1950.** *American Meteorological Society, Bulletin*, 33(7):299–302, Sept. **1952.** 3 figs., table, 2 refs. **MH-BH**—Several descriptions of unusual vertical air currents encountered by sailplane pilots near Warm Springs, Calif. indicate that the vertical waves in the airflow "were confined to the layer above the inversion since the pilots entered lift at about 3000 feet, while they had encountered only light turbulence below that level." Using the pilots' descriptions and pilot balloon observations (given in a table and plotted on a pseudo-adiabatic chart) the author constructed a schematic picture of the probable wave formation (illustrated in a diagram). The observed conditions are found to agree with results of the formula of ELIASSEN for vertical wave length and with that of HAURWITZ for the horizontal wave length "in the wave pattern in the lower stratocumulus clouds near the lower inversion surface." *Subject Headings:* **1. Vertical currents 2. Wave formation 3. Warm Springs, Calif.**—*I.L.D.*

4.6–156 551.558.1

Scorer, R. S. and Ludlam, Frank Henry, **Bubble theory of penetrative convection.** *Royal Meteorological Society, Quarterly Journal*, 79(339):94–103, Jan. **1953.** 6 figs., 10 refs., 5 eqs. **DWB**—Penetrative convection in which air rises through a large environment is studied as an intermittent jet rising as bubbles from a localized source. A bubble sheds its outer skin into a disturbed wake until it disappears; in the wake the ascent of further bubbles is facilitated.

Above the bubble the air is lifted and cooled and drains down outside. Bubble structure is illustrated by photographs of Cu. The limiting velocity of a cumulus tower is calculated from its buoyancy and agrees with observation. Transport of heat upwards occurs mainly by aggregation of small bubbles into large. *Subject Headings:* **1. Bubble theory 2. Entrainment.** —*C.E.P.B.*

4.6–157 551.558.21

Scorer, R. S., **Theory of airflow over mountains: II—The flow over a ridge.** *Royal Meteorological Society, Quarterly Journal*, 79(339):70–83, Jan. **1953.** 7 figs., 15 refs., 49 eqs. **DWB**—Types of flow defined are *aerodynamic* in statically neutral air near the ground, *barostromatic* in stably stratified air and *geostrophic*. The equations of flow over a ridge are formulated and the effect of varying degrees of stability in a uniform stream on vertical displacement illustrated. Flow oblique to the ridge leads to lateral displacement. The formation of trains of lee waves is discussed and their effect on tracks of balloons examined. Finally, the effects of vertical variations of stability and horizontal velocity on the amplitude of the disturbance at high levels are reviewed. (For Pt. I, *see Royal Meteorological Society, Quarterly Journal*, 75:41, 1949.) *Subject Headings:* **1. Lee waves 2. Orographic effects.**—*C.E.P.B.*

AQUEOUS VAPOR AND HYDROMETEORS

EVAPORATION

See also: **Velocity, temp. and humidity profiles in lower atmos.** (Björgum), 4.6–95; **Temp. and humidity gradients in 1st 100 m, Eng.** (Best), 4.6–129.

4.6–158 551.573:551.579.5

*Mostinskaia, S. B., **Osobennosti raskhodovaniia pochvennoĭ vlagi mnogoletnimi travami.** [Peculiarities of transpiration of soil moisture by perennial grasses.] *Leningrad. Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby, Informatsionnyĭ Sbornik*, No. 1:109–125, **1951.** 16 tables, 10 refs. **DLC**—Data are given for the changes of productive moisture in different layers under black fallow, summer wheat, lucerne and red clover. These data are compared with the development of the root system. The author gives regression equations for the dependence of the moisture changes on temperature, precipitation and moisture content during different development phases of lucerne and clover. The moisture exchange between the root layer and lower layers is not considered. *Subject Headings:* **1. Soil moisture 2. Evapotranspiration.**—*A.A.*

4.6–159 551.573:581.1

Penman, Howard Latimer and Schofield, R. K., **Some physical aspects of assimilation and transpiration.** (In: Society for Experimental Biology, [of Gt. Britain], Symposia No. 5: **Carbon Dioxide Fixation and Photosynthesis, 1951.** p. 115–129. table, 11 refs.) Abstracted from reprint. **DLC**—A discussion of diffusion through leaf stomata leads to a theoretical ratio of transpiration from a crop to evaporation from open water, taking account of length of day. The calculated results are of the same order of magnitude as the observed ratios in a field at Rothamsted. Similar calculations for transpiration of CO_2 showed however that assimilation rates are only a small fraction of what they could be. This is attributed to the building up of relatively high CO_2 concentrations inside the leaf. *Subject Headings:* **1. Evapotranspiration 2. Plant respiration.**—*C.E.P.B.*

4.6–160 551.573

*Schubach, K. (*Giessen, Germany*), **Wasserhaushaltsuntersuchungen an verschiedenen Bodenarten unter besonderer Berücksichtigung der Verdunstung.** [Investigations on the water economy of different soils with special regard to evaporation.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 40, **1952.** 14 p. 5 figs., tables. **DWB**—Results of measurements with an improved evaporimeter according to Popov are given (daily values of water content and evaporation from sand, humus and loess, and data for precipitation,

temperature, wind velocity, relative humidity and vapor pressure from April 1950 to March 1951). Annual evaporation—267 mm for sand (30% of the precipitation), 321 mm (37%) for humus and 395 mm (45%) for loess. The relative distribution of evaporation within the year is almost the same for all three soil types. *Subject Headings:* **1. Evaporation 2. Evaporimeters. I. Popov, V.**—*A.A.*

4.6–161 551.573:551.579.5

Vilkner, Hans, **Wasseraufnahme und Verdunstungschutzwirkung der Pflanzen. Untersucht mit der Differenzmethode bei der Bodenfeuchtigkeitsmessung.** [Water uptake and protective effect of plants against evaporation. Investigation by the difference method in measurement of soil moisture.] *Angewandte Meteorologie*, 1(8):235–241, Dec. **1952.** 2 figs., 3 tables, 2 refs. **MH-BH**—Soil moisture at depths 5–100 cm is measured regularly in two similar fields, one with vegetation, and one bare, and differences between fields plotted as isolines on a depth-time diagram. Examples used are beanfield and grass. Total loss in beanfield is less than evaporation from bare soil; beans take their moisture mostly from 30–40 cm down. Under grass, surface is drier but deeper soil moister than bare ground. Other plant types are classified according to vertical change of moisture difference and agricultural implications considered. *Subject Headings:* **1. Evaporation 2. Soil moisture.**—*C.E.P.B.*

CONDENSATION AND ICING

See also: **Physical and operational aspects of aircraft icing** (Rodert), 4.6–11; **Invasion of radioactive air of atomic origin and influence of precip.** (Garrigue), 4.6–239; **Radioactivity of free air** (Garrigue), 4.6–240.

4.6–162 551.574.1:551.575.1:551.591.1

Best, A. C., **Condensation nuclei and the development of radiation fog.** *Royal Meteorological Society, Quarterly Journal*, 79(339):112–120, Jan. **1953.** 4 tables, 8 refs., 19 eqs. **DWB**—Expressions are derived for growth of liquid water droplets on condensation nuclei (sea salt) as humidity rises from 80–100%, and tables calculated for rate of growth of drops, and of liquid water content W as a function of size distribution of nuclei and relative humidity. Size distribution has little effect but at saturation W varies as $\sqrt{(\text{mean mass of nuclei})}$. Near saturation a very small variation of humidity has a very large effect on W. Expressions are developed for drop size distribution (RH 100%). Visibility in water fog is briefly considered. (*See also* 3.5–275, May 1952, *MAB.*) *Subject Headings:* **1. Condensation nuclei 2. Radiation fog 3. Visibility.**—*C.E.P.B.*

4.6–163 551.574.1:551.578.4

Itoo, K., **On the growth of ice crystals in the air.** *Papers in Meteorology and Geophysics*, 2(3–4):315–316, Dec. **1951.** 2 figs., 3 tables. **MH-BH**—Three types of hexagonal plate type ice crystals in the air are shown and a few data are given for the diameter, thickness and volume in different stages of growth. *Subject Headings:* **1. Ice crystal formation 2. Cloud physics.**—*A.A.*

4.6–164 551.574.1:551.578.41

Mason, Basil John, **The growth of ice crystals in a supercooled water cloud.** *Royal Meteorological Society, Quarterly Journal*, 79(339):104–111, Jan. **1953.** 7 figs., 3 tables, 4 refs., 17 eqs. **DWB**—Theoretical expressions are derived for growth rate of simple ice crystals at rest in a supercooled water cloud at temperatures 0 to −40°C, and compared with measured values in cold chambers. Photographs show crystal habits at different temperatures. The effect of fall of the crystal is examined, and a criterion found for transition from polyhedral to dendritic growth occurring when crystal radius exceeds 100μ. *Subject Heading:* **1. Ice crystal formation.**—*C.E.P.B.*

4.6–165 551.574.1:551.578.41

*Wexler, Raymond and Boucher, Roland J., **Heat balance of a growing ice particle.** Mount Washington Observatory, Contract AF 19(122)-399, Scientific Report, No. 2, June 30, **1952.** 7 p. 2 figs., 3 tables, 4 refs. **DWB**—The heat balance equation for ice crystals growing

at water saturation at temperatures between 0 and −30°C is solved for different saturated adiabats. The maximum rate of growth of ice crystals is found to occur at −18°C to −20°C. *Subject Headings:* **1. Ice crystal formation. I. Mount Washington Observatory II. Contract AF 19(122)-399.**—*Authors' abstract.*

4.6–166 551.574.42

Brunner, Thomas, **Einige Beobachtungen über das Haften von Eis an Oberflächen.** [Some observations on the adhesion of ice to surfaces.] *Zeitschrift für angewandte Mathematik und Physik*, 3(6):460–466, **1952.** 5 figs., 3 tables. English summary p. 466. **DLC**—The paper deals with the adhesion of pure ice to metallic and nonmetallic surfaces. An instrumental setup is shown and preparation of materials described. It is found that adhesion depends on the nature of the surface rather than on the material. On clean metal surfaces it was 8 kg/cm², about the same as the shearing strength of ice. A surface film of silica grease reduced this to 3–4 kg. Other methods of minimizing adhesion are briefly discussed. *Subject Heading:* **1. Icing research.**—*C.E.P.B.*

4.6–167 551.574.42:621.315

Brunner, Thomas, **Energiebedarf zur Verhütung von Vereisungen an Freileitungen.** [Energy requirement for prevention of icing on free conductors.] *Zeitschrift für angewandte Mathematik und Physik*, 4(1):24–34, Jan. 15, **1953.** 7 figs., 2 tables, 7 refs., 7 eqs. English summary p. 34. **MH-BH**—Ice was produced by spraying water into a wind tunnel at −15 to −5°C, wind 0–20 m/s, containing an electrically heated rod 30 cm×1 cm diameter. An equation for heat lost by conduction and evaporation is developed and the energy requirements to keep the rod dry and ice-free at various temperatures and wind speeds in saturated air calculated. Under extreme conditions (temperature −15°C, wind 20 m/s), 1.1 W/cm² of projected area suffices to keep the rod clear. *Subject Heading:* **1. Icing of cables.**—*C.E.P.B.*

4.6–168 551.574.42:551.311.1

Ogura, Yoshimitsu (*Geophysical Inst., Tokyo Univ.*), **A supplementary note on the problem of ice formation.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 30(7):231–239, July **1952.** 6 figs., 5 refs. **DWB**—The author deals theoretically with the problem of ice formation with a view of extending his previous study. The formula which approximately represents the speed of the growth of an ice layer is derived as $E_0 = -\frac{k}{d} + \sqrt{\frac{k^2}{d} - \frac{2k}{L\rho i}\int_0^t U(t)dt}$, where E_0: thickness of ice layer; t: time measured from the beginning of ice formation; $U(t)$: air temperature at a point sufficiently far from the ice surface; k: coefficient of heat conduction of ice; ρi: density of ice; L: melting heat of ice; d: heat transfer coefficient. The good agreement between this theoretical result and the experimental data recently obtained by K. NEUMANN verified the validity of this formula. The relation between d and wind velocity is discussed and heat transfer from the surface of ice into the air is explained by accounting for the turbulent boundary layer existing near the surface. *Subject Headings:* **1. Ice formation 2. Temperature effects 3. Wind effects 4. Ice mechanics 5. Japan. I. Neumann, K.**—*From author's abstract.*

CLOUDS

See also: **18th century cumulonimbus clouds** (McCaffery), **4.6–106**; **Cloud cover influence in twilight, Norway** (Wexler, Boucher), **4.6–237.**

4.6–169 551.576.11:551.501.81

Foster, Hal, **A radar observation of Benard cells.** *Journal of Meteorology*, 9(6):437–439, Dec. **1952.** 2 figs., 3 refs. **MH-BH**—PPI photographs at Cambridge, Mass., March 24, 1952, show a fine cellular structure below nimbostratus. This is attributed to a cellular circulation below an inversion. *Subject Headings:* **1. Cloud structure 2. Radar observations.**—*C.E.P.B.*

4.6–170 551.576.11:629.135.2

Harper, R. D. M., **An unusual 'distrail.'** *Weather*, 8(1):29, Jan. **1953. MH-BH**—Account of clear lane in growing ACu formed by an aircraft flying below the cloud. *Subject Heading:* **1. Negative condensation trails.**—*C.E.P.B.*

4.6–171 551.576.11:629.13

Scorer, R. S., **Contrails and distrails.** *Meteorological Magazine*, London, 82(967):27–28. Jan. **1953.** 4 photos. **MH-BH**—Photographs of clouds over Wimbledon (SW London) in which a short condensation trail formed with a clear lane at each end. The lanes developed into rows of holes and author thinks they formed in water cloud evaporated by the exhaust. *Subject Headings:* **1. Condensation trails 2. Negative condensation trails 3. London, England.**—*C.E.P.B.*

PRECIPITATION

See also: **Heavy thunderstorm, Oxford** (Smith), 4.6–110; **Climatic chart, Hispaniola** (Cucurullo), 4.6–210.

4.6–172 551.577.32(82)

*Prohaska, Federíco J. (*Chief, Clim. Div. Serv. Met. Nacional, Buenos Aires*), **Regímenes estacionales de precipitación de Sudamerica y mares vecinos (des de 1.5°S. hasta Antártida).** [Seasonal precipitation regime for South America and neighboring seas (from 15°S to the Antarctic).] *Meteoros*, Buenos Aires, 2(1/2):66–100, Jan./June **1952.** 10 figs., 5 tables, 14 refs. English summary p. 66. **DWB**—Seven main regional precipitation types or areas are distinguished for temperate and subtropical South America (10°–50°S). These types are based on monthly or seasonal precipitation histograms for nearly 100 stations (shown on large chart) and annual isohyetal chart for southern South America. Each rainfall regime is then described in terms of pressure and circulation patterns, etc., and the basic factors represented graphically or in illustrative tables, cross sections, etc. This is an excellent analytical study. *Subject Headings:* **1. Precipitation regime 2. Southern South America.**—*M.R.*

4.6–173 551.577.32:551.553.21(54)

*Naqvi, S. M. (*Dir. N. W. Met. Region, Lahore*), **Coefficient of variability of monsoon rainfall in India and Pakistan.** *Pakistan Geographical Review*, Lahore, 4(2):7–17, **1949.** 4 figs., tables, refs. **DLC**—The coefficient of variability of monsoon rainfall was calculated for India and Pakistan on the basis of 68 individual stations. The mean rainfall, standard deviation and the coefficient of variability are given in a table and isopleths of the coefficient of variability and frequencies of droughts and floods are shown on maps. The coefficient of variability of monsoon rainfall is small (20% or less) in regions where it is principally due to orography and it is large in regions where monsoon rainfall is scanty and where it is due to interaction of different air masses. The regional distribution of coefficients of variability is analyzed. The limits of accuracy to be aimed at in seasonal forecasting of monsoon rainfall are discussed and it is concluded that they should be within the limits of the coefficients. A close correspondence is found between the coefficients of variability of rainfall and the number of floods and droughts in a region. *Subject Headings:* **1. Monsoon rains 2. Variability coefficients 3. Floods 4. Drought 5. India 6. Pakistan.**—*I.L.D.*

4.6–174 551.577.36(675)

Bultot, F., **Sur le caractère organisé de la pluie au Congo Belge.** [On the systematic character of the rain in the Belgian Congo.] *Institut National pour l'Étude Agronomique du Congo Belge, Bureau Climatologique, Communication*, No. 6, **1952.** 16 p. 8 figs., 3 tables, 10 refs. **DWB**—In a study of daily rainfalls at 286 stations it is found that on any day the falls though scattered are generally within a limited region which migrates slowly eastward. Taking 12 stations in east of lower Congo Valley, the number with rain has a linear relation to median daily rainfall. The frequency of different numbers of consecutive days with rain at half or more of the stations is set out; such rainy periods rarely exceed 3 days. *Subject Headings:* **1. Precipitation frequencies 2. Belgian Congo.**—*C.E.P.B.*

4.6–175 551.577.37

*Marchetti, Adolfo A., **Frecuencia de las lluvias intensas de corta duracion en la ciudad de Buenos Aires.** [Frequency of intense rains of short duration in Buenos Aires.] *Meteoros*, 2(1/2):7–24, Jan./June **1952.** 3 figs., 9 tables. English summary p. 7. **DWB**—Data for a 30-year period (1921–1950) for the Central Observatory of Buenos Aires are analyzed for 5,

10, 15, 20, 30, 45, 60, 90 and 120 minute duration, and .033, .05, .10, .20, 0.5, 1, 2, 3, 4, 5, 6, 10 and 12 occurrences per year of each intensity. Curves are shown for both time intensity and frequency intensity, and equations based on these curves derived. The actual contingency tables are presented according to various criteria of the interrelationships. Heavy rains are then classified according to 5 class limits which are based on derived curves for once in 30, 20, 10, 5 and 1 year frequency. *Subject Headings:* **1. Rain duration intensity frequencies 2. Heavy rain classification 3. Buenos Aires, Argentina.**—*M.R.*

4.6–176 551.577.37:551.506.3(52)

*Morioka, Japan. Weather Station, **A chronological table of heavy rains in Iwate Prefecture.** *Iwate Meteorological Association, The Review*, p. 33–38, Nov. **1951.** entirely tables. In Japanese; English summary, append. p. 4–5. **DWB**—Heavy rains (with rainfall amounts exceeding 100 mm in one day) observed at any one of the 2nd class stations in Iwate Prefecture during the period 1908–1950 are listed in chronological order in tables giving date and location of observation, rainfall amount, cause of the rain and classification number based on a list of 4 types of rainfall, for each of which a brief definition is given. *Subject Headings:* **1. Excessive rainfall 2. Rainstorms 3. Long period records 4. Iwate Prefecture, Japan.**—*G.T.*

4.6–177 551.577.37(54)

Panduranga Rao, M. and Malurkar, S. L. (*Colaba Obs., Bombay*), **Heavy rainfall in Bombay in September 1949 and 1930.** *Indian Journal of Meteorology and Geophysics*, Delhi, 3(1):52–55, Jan. **1952.** 2 tables. **MH-BH**—The rainfall which fell from midnight Sept. 21 to midnight Sept. 23, 1949 was the heaviest recorded since 1941; the Newman rain gage recorded 31.69 inches of rainfall. The same month of September had the highest rainfall for the past 100 years. The next highest September rainfall was recorded in 1930 with 43.77 inches, 21.59 inches fell on a single day. A comparative statement of rainfall as recorded by the different rain gages in the Colaba Observatory and the hourly totals of rainfall at Colaba and Alibag are given in tables. The synoptic conditions associated with heavy rainfall are described. *Subject Headings:* **1. Excessive rainfall 2. Bombay, India.**—*I.L.D.*

4.6–178 551.577.51

Wensien, Hans, **Wetterskizze Nr. 11—Labilisierungseinfluss der Ostsee bei herbstlicher Ostwetterlage.** [Weather sketch No. 11—Labilizing influence of the Baltic during autumn east-weather types.] *Annalen der Meteorologie*, 4(10–12):475–477, **1951.** fig., 2 tables. **DWB**—Heavy showers in Schleswig-Holstein in a high pressure area on Oct. 25–26, 1950 are shown to be due to cold air from the east becoming moist and unstable as it crossed the warm Baltic. *Subject Headings:* **1. Rainfall controls 2. Schleswig-Holstein, Germany.**—*C.E.P.B.*

4.6–179 551.577.61:69

Knetsch, Georg, **Geologie am Kölner Dom. Eine Studie über Klimagesteuerte und dazu konvergente Bauschäden.** [Geology of Cologne Cathedral. A study of climatic and similar damage to a building.] *Geologische Rundschau*, 40(1):57–73, **1952.** 10 figs., refs. **DLC**—A study of the weathering of different parts of Cologne Cathedral, which was built of different types of stone from 1248 onwards. The weathering is mainly chemical, by rain and wind or dripping water; frost damage is unimportant, but the whole complex of factors depends on position in the building and is difficult to analyze. Photos of weathering given. *Subject Headings:* **1. Weathering 2. Cologne, Germany.**—*C.E.P.B.*

SNOW

See also: **Growth of ice crystals in air** (Itoo), 4.6–163; **Growth of ice crystals in supercooled water cloud** (Mason), 4.6–164; **Heat balance of growing ice particle** (Wexler, Boucher), 4.6–165.

4.6–180 551.578.41

†Eugster, H. P., **Beitrag zu einer Gefügeanalyse des Schnees.** [Contribution to the structure analysis of snow.] *Beiträge zur Geologie der Schweiz, Geotechnische Serie, Hydrologie,*

Bern, No. 5, 1952. 64 p. 42 figs., 8 tables, 3 plates (1 fold.), bibliog. p. 64. **DWB**—A classification of single snow crystals is presented (main groups: hollow forms, full forms, wet snow granules) and the metamorphosis during the winter studied in detail. Numerical characteristics of snow structure are proposed, results of measurements presented and the relationship between the numerical characteristics discussed. The dependence of mechanical properties (tensile strength and viscosity) on the structure is investigated. *Subject Headings:* **1. Snow structure 2. Snow metamorphosis 3. Snow crystals.**—*A.A.*

4.6–181 551.578.46

de Quervain, Marcel R.; Zingg, Theodor; Roch, André and Schild, Melchior, **Die Lawinenkatastrophen in den Schweizer Alpen Januar und Februar 1951.** [The avalanche catastrophes in the Swiss Alps, Jan. and Feb. 1951.] *Die Erde*, Berlin, **1952.** p. 15–32. 9 figs., 7 photos, 2 tables. **DLC**—Weather from end of Oct. 1950 to mid Jan. 1951 resulted in a deep, loose snow layer, followed by a series of warm and cold waves and more heavy snow (up to 250 cm) on Jan. 16–22; Jan. snowfall was 2–5 times normal. Avalanches began on Jan. 19. More heavy snow, especially S of main Alpine ridge (up to 400 cm Feb. 4–14), caused further avalanches. In two months there were 1206 destructive avalanches; deaths and damage exceeded previous worst, 1887–88. When snow compacted the risk was over. Protective measures are discussed. *Subject Headings:* **1. Avalanches 2. Alps.**—*C.E.P.B.*

4.6–182 551.578.46:551.501(410)

Hawke, Erik Ludlow and Bonacina, Leo C. W., **The snow survey of Great Britain.** *Royal Meteorological Society, Quarterly Journal*, 79(339):168–171, Jan. **1953. DWB**—Both emphasize need for close network of stations reporting for snow survey, criticized by reviewer of British Glaciological Society's Report (*Quarterly Journal*, 78:652, 1952). Reviewer (G. MANLEY) stands by his criticism. *Subject Headings:* **1. Snow surveys 2. British Isles. I. Manley, G.**—*C.E.P.B.*

4.6–183 551.578.46:551.509.58

Sales, M., **Service de détection des avalanches au chantier des Brevières.** [The avalanche forecasting department of the Brevieres construction site.] *La Houille Blanche*, Grenoble, 7(1):41–51, Jan./Feb. **1952.** 6 figs. **DLC**—A brief description is given of the snow and weather conditions which caused the avalanches of Feb. 1950 and led to the creation of an avalanche forecasting department. Avalanche danger is calculated graphically from measurements indicating the "index of rupture," density, depth, and degree of metamorphosis of the snow. These snow data are combined with meteorological observations in order to forecast avalanches. The equipment, operation and organization of the department are described and its efficiency during the Feb. 1951 avalanches commented upon. *Subject Heading:* **1. Avalanche forecasting.**—*M.P.K.*

4.6–184 551.578.46:624(494)

Switzerland. Inspektion für Forstwesen, Jagd und Fischerei, **Der Lawinenwinter, 1950/1951.** [Winter avalanches, 1950/1951.] *Switzerland. Inspektion für Forstwesen, Jagd und Fischerei, Veröffentlichung über Verbauungen*, No. 6, **1951.** 157 p. 28 figs., 22 photos, 14 refs. **DWB**—The individual reports describing the avalanches that occurred in Switzerland during the winter 1950/1951 are presented. The report by TH. ZENGG contains an analysis of the synoptic situation and snow conditions in the Swiss Alps during the winter 1951/1952. The remaining reports deal with the specific topographic conditions, the courses of the individual avalanches and the damage caused by them. In addition, this monograph contains an account of avalanches during the winters of 1887/1888, 1916/1917, 1934/35, 1944/45 and a detailed discussion of measures to provide protection against avalanches. *Subject Headings:* **1. Avalanches 2. Avalanche protection 3. Swiss Alps 4. Switzerland. I. Zengg, Th.**—*I.L.D.*

4.6–185 551.578.46:551.579.2:551.507.1(78)

Work, Robert A., **Mechanized snow surveys in Montana.** *Western Snow Conference, Proceedings 1948*, p. 165–167, Feb. **1949.** fig. Discussion by Fred Paget, p. 168–170. **DWB**

—A network of 31 new snow courses extending from Lakeview, Montana, along the last lope of the Continental Divide for 300 mi. to Glacier Park, makes use of "Sno-Cats" to enable he snow surveys to be made more rapidly and frequently. These mechanized surveys were egun in February 1948, and the results will be of benefit to forecasters in both the Missouri nd Columbia Basins. *Subject Headings:* **1. Snow surveys 2. Mechanized observations 3. Runoff forecasting 4. Northern Rocky Mountains 5. Montana. I. Paget, Fred.**—*M.R.*

HYDROMETEOROLOGY

See also: **Bibliog. on hydrology, 1941–50, U. S. and Canada** (Linsley), 4.6–7; **Transpiration of soil moisture by perennial grasses** (Mostinskaia), 4.6–158; **Water uptake, protective effect of plant against evaporation** (Vilkner), 4.6–161; **Mechanized snow surveys, Montana** (Work), 4.6–185; **Water balance in arid and semiarid climates** (Thornthwaite), **4.6–212.**

4.6–186 551.579:518.2

Beard, Leo R., **Statistical methods in hydrology.** Wash., D. C., Office, Chief of Engineers, Dept. of the Army, July **1952.** 35 p. 21 figs., 9 refs., 29 eqs. **DWB**—An introduction to the nalysis of variance, correlation analysis and frequency curves, precipitation frequency studies, etc. Numerous examples with clear definitions of statistical terms. *Subject Headings:* **1. Statistical techniques 2. Hydrology. I. U. S. Engineer Dept.**—*A.A.*

4.6–187 551.579.4:627.51

Calef, Wesley, **Die Hochwasser des Sommers 1951 in den mittleren Vereinigten Staaten und das Problem der Hochwasserkontrolle in den USA.** [The high water of summer 1951 n the central USA and the problem of flood control in the USA.] *Die Erde*, Berlin, **1952.** o. 1–14. fig., 4 photos. **DLC**—In 1930 measures in USA, except lower Mississippi, changed rom flood protection to flood prevention. Extensive high floods in a whole river system are he hardest problem, solved only on the Tennessee at huge cost. The meteorology and damage f the floods of spring 1951 in Red River of the North (melting snow) and in summer 1951 in Kansas and Missouri (record rainfall) are described. Various plans for future control are liscussed but the problem is very difficult and author favors delimitation of flood plain zones. *Subject Headings:* **1. Floods 2. Red River of the North 3. Missouri.**—*C.E.P.B.*

4.6–188 551.579.4(94)

Evans, Gwynneth Audrey and Sherlock, Noel Vivette, **Butler's swamp, Claremont.** *Western Australian Naturalist*, Perth, 2(7):152–159, Dec. **1950.** 5 figs., table. **GB-MO**—Butler's swamp, in a hollow 6 mi S.W. of Perth, Western Australia, formed in 1918–20. It is attributed to a rise of the water table probably due to increased rainfall. *Subject Headings:* **1. Water level variations 2. Western Australia.**—*C.E.P.B.*

4.6–189 551.579.4:551.501.4

Smetana, Jan (*Hydrologic Inst., Prague, Czechoslovakia*), **Water: Analysis and utilization of data.** (In: United Nations Scientific Conference on the Conservation and Utilization of Resources, Lake Success, N. Y. 1949, **Proceedings, v. 4, Water resources,** p. 78–80, **1951.** ig.) **DWB**—The author proposes a rational classification of floods based on the frequency distribution, shows how to apply this method for practical use and gives a short report on hydrologic research and projects in Czechoslovakia. *Subject Headings:* **1. Flood classification 2. Flood frequencies 3. Data processing 4. Czechoslovakia.**—*A.A.*

4.6–190 551.579.5:551.525.5

Dadykin, V. P., **Nekotorye opyty po peredvizheniiu vody v merzloĭ pochve.** [Experiments on water movement in frozen soil.] *Pochvovedenie*, Moscow, No. 9:794–801, Sept. **1952.** ig., 8 tables, 5 refs. **DLC**—Author assumed that there should be a certain amount of moisture available to plant roots even in frozen ground, because not all water is frozen. Field peas, located in frozen ground under laboratory conditions at temperatures up to −5°C and a relative ice content up to .69, showed an increase in weight after a certain time (64% at −0.3°C,

140% at −2.0°C, 122% at −5°C). The dependence of necessary osmotic pressure on temperature is shown. *Subject Headings:* **1. Soil moisture 2. Frozen soil 3. Agricultural meteorology.**—*A.A.*

4.6–191 551.579.5(62)

Murray, G. W., **The water beneath the Egyptian western desert.** *Geographical Journal*, 118(4):443–452, Dec. **1952.** fig., refs. **DWB**—The contours of the underground water level in Egypt and the Sudan are mapped and discussed, varying from 350 m above MSL in the SW to 100 m in the Quattara depression. It is considered that this artesian water is derived from rainfall on the hills in the SW many thousand years ago, percolating NE through sandstones. The level is falling but there is still a large reservoir. *Subject Headings:* **1. Underground water 2. Egypt 3. Sudan.**—*C.E.P.B.*

4.6–192 551.579.5

*Pavlovskiĭ, M. A., **Zimniaia kondensatsiia vlagi v verkhnikh gorizontakh dernovo-podzolistykh i temnotsvetnykh pochv (pod razlichnymi ugodiiami i pri razlichnoĭ glubine obrabotki).** [Winter condensation of moisture in the upper level of sod-podzolic and dark colored soils (made under different crops and at different depths of ploughing).] *Pochvovedenie*, Moscow, No. 9:784–793, Sept. **1952.** 5 tables, 11 refs. **DLC**—Observations made during the winter 1950/51. The moisture flux from lower soil layers and condensation in the cold surface layer was found a considerable factor in the water balance of the soil near the surface. The increase in water content of the 30 cm thick surface layer was 80–202 mm, dependent on the kind of soil, crops and wood (14–35% of the mean annual precipitation or 156–400% of the precipitation during the given winter). The freezing depth was 20–100 cm, the height of snow cover 20–60 cm. *Subject Headings:* **1. Soil moisture 2. Agricultural meteorology.**—*A.A.*

4.6–193 551.579.5:551.501

Richards, L. A. and Moore, D. C. (*U. S. Salinity Lab., Riverside, Calif.*), **Influence of capillary conductivity and depth of wetting on moisture retention in soil.** *American Geophysical Union, Transactions*, 33(4):531–540, Aug. **1952.** 4 figs., 2 tables, 20 refs. **MH-BH**—An investigation of water relations in soil "where there exists a more or less continuous phase of gas at atmospheric pressure, in addition to soil particles and the water." The movement of moisture in unsaturated soil is explained with the aid of the Darcy relation, $v = ki$ (v = volume of water which in unit time crosses unit area in the soil at right angles to flow; i = hydraulic gradient, and k = Darcy permeability coefficient), and the measurement of equivalent negative pressure and hydraulic heat of water in unsaturated soil by ceramic cups is discussed. "Published data on capillary conductivity (unsaturated permeability) are summarized and additional new data for six soils are presented along with a new pressure type apparatus for measuring capacity conductivity." The dependence of the method of estimating field capacity, by measuring the moisture content of a mass of soil that has been wetted and allowed to stand a specified time in contact with dry soil, upon depth of wetting is illustrated by laboratory tests on these soils. This dependence is explained by the fact that the "capillary conductivity of soils remains appreciable over a considerable range of moisture content below field capacity." *Subject Headings:* **1. Soil moisture conductivity 2. Soil moisture measurement.**—*From authors' abstract.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See also: **Comparison: observed and geostrophic winds in low lat.** (Jordan), 4.6–152; **Geographical spread of selected plants and causes, Argentine Chaco** (De Fina, Garbosky), 4.6–211.

4.6–194 551.58(09)(47)

Borisov, A. A., **Opredelenie poniatiia "klimat" v sviazi s razvitiem klimatologii v Sovetskom Soiuze.** [Definition of the concept "climate" in connection with the development of

climatology in the Soviet Union.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Izvestiia*, 84(4): 391–398, July/Aug. **1952.** refs. **DLC**—The development of climatology in Russia from the 18th century to the present day and various definitions of climatology with their meteorological bases and implications are reviewed. The development of climatology in Russia is divided into three periods: up to 1847, 1947–1917 and 1917 to date. In the last period climatology is reviewed by Soviet climatologists from three aspects: 1) meteorological, 2) synoptic or weather and 3) geographic; the names of the more important investigators included with their points of view are listed. A list of definitions of climate, formulated by both Russian and non-Russian climatologists, arranged in chronological order, is appended to the article. *Subject Headings:* **1. History of climatology 2. Definitions 3. U.S.S.R.**—*I.L.D.*

4.6–195 551.58:629.13

Cunningham, Glenn (*U.C.L.A., Los Angeles, Calif.*), **A map of flying weather.** *Association of American Geographers, Annals*, 42(3):247–250, Sept. **1952.** fig. **DLC**—From the many factors affecting flying weather, ceiling and visibility are chosen as the most important. A map of the U. S. showing frequency distribution of various degrees of contact flying weather (as determined by combinations of ceiling and visibility) is presented with the purpose of serving as a source of information for geographers. The map is found to conform to known conditions of fog frequency, sunshine, etc. *Subject Headings:* **1. Contact flying weather 2. Ceiling and visibility frequencies 3. Aeronautical climatology 4. United States.**—*G.T.*

CLIMATE OF PARTICULAR PLACES

See also: **Bio-climatic atlas of Israel** (Ashbel), 4.6–1; **U. S. coast pilot, Atlantic** (U. S. Coast and Geodetic Survey), 4.6–20; **Century of London weather** (Marshall), 4.6–35.

4.6–196 551.582(82)

*Gimenez, Lida Raquela (*Nac. Tucumán Univ., Inst. of Geog. Studies*), **El clima de verano en el Valle de Tafi.** [Summer climate in the Valley of Tafi.] *Tucumán, Argentina. Universidad Nacional. Instituto de Estudios Geográficos, Publicaciones Especiales*, 2:107–118, **1951.** tables. In Spanish, German summary p. 117–118. **DWB**—This isolated and almost arid valley lies in the mountains of Aconquija (Tucumán Province) at an elevation of 2000 m. The climatic summer lasts from Nov. through March. Precipitation records for the period 1936–48, and temperature, humidity, cloud and wind data for 1948–9 are analyzed and discussed briefly. Short illustrative tables of frequencies (based on one season's records) are included. Annual rainfall amounts to 400 mm (16 in.) on the average, 70% occurring in Nov.–March. Cloudiness, humidity and rain are at a maximum in Jan. An occasional "zonda" wind—hot dry north wind—occurs in summer. These are the strongest winds experienced in the valley. *Subject Headings:* **1. Summer climate 2. Orographic effects 3. Tafi Valley, Tucumán Province, Argentina.**—*M.R.*

4.6–197 551.582(72)

*Rivera Aceves, Jorge, **Meteorología y climatología de la Peninsula de Yucatan.** [Meteorology and climatology of the Yucatan Peninsula.] *Sociedad Mexicana de Geografía y Estadística, Boletín*, 69(3):113–134, May/June **1950.** charts, tables. **DWB**—Summarizes the principal climatic characteristics of the region: temperature, pressure, wind, rainfall, relative humidity, cloudiness, fog, dew, vapor pressure and frost. Monthly and annual data are tabulated for most of these elements and for insolation for 8 stations for 1921–1930 (period of record varies). One chart presents rainfall isopleths. The climates are classified according to Köppen and illustrated with a chart. *Subject Headings:* **1. Climatic data 2. Köppen's classification 3. Yucatan Peninsula, Mexico.**—*M.L.R.*

4.6–198 551.582.1(82)

Fochler-Hauke, Gustav, **Das Campo de Velazco. Naturlandschaftskundliche Skizze eines nordwest-argentinischen Bolson.** [Campo de Velazco. A geographical sketch of a NW-Argentine depression.] *Erdkunde*, 6(4):234–247, **1952.** 4 charts, fig., 8 photos, 22 refs. **DWB**—The structure and climate of this arid Sierran depression (29°S, 67°W) are described.

Mountain and valley winds are well developed. The föhn-like zonda is the chief local wind. Hydrography and plant geography are summarized. *Subject Headings:* **1. Local climates 2. Campo de Velazco, Argentina.**—*C.E.P.B.*

4.6–199 551.582.2(44)

*Rebotier, R. (*Clermont-Ferrand, France*), **Étude du climate de la Limagne.** [Study of the climate of Limagne.] *Puy-de-Dôme. Observatoire, Publications, Serie B*, No. 2, **1952.** 5 p. 9 tables. **DWB**—Data on temperature, daily range in temperature, frequency of days with freezing temperatures ($\leqslant 0°$ and $\leqslant -5°C$) with extreme heat ($\geqslant 30°$ and $\geqslant 35°C$), precipitation by 10-day periods, frequency of snow and snow cover, thunderstorms and fog, mean vapor pressure and relative humidity, and, finally, the index of aridity A>P are given in tables and compared month by month on histograms for Limagne in the Dept. of Puy-de-Dôme for the 6-year period, 1945–1950 inclusively. A paragraph or two of descriptive analysis of each of these elements is included. *Subject Headings:* **1. Climatic analysis 2. Climatic data 3. Climate of Limagne, France 4. Limagne, France. I. Comité Météorologique du Puy-de-Dôme.**—*M.R.*

4.6–200 551.582.3(09) 551.509.21(09)

†Schlegel, Max, **Alte meteorologische Karten und Welt-Atlanten.** [Old meteorological charts and world atlases.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 35:327–328, **1952.** 6 refs. **MH-BH** –Bibliographical details and brief summaries of 12 charts from HALLEY (1686) to BARTHOLOMEW (1899) and 6 synoptic charts from BRANDES (1826) to BUYS-BALLOT (1854). *Subject Headings:* **1. Climatic charts 2. Synoptic charts 3. History of meteorology.**—*C.E.P.B.*

CLIMATIC CHANGES

4.6–201 551.583.2

Schulze, Alfred, **Eine Methode zur Erfassung von Jahresgängen.** [A method of determining annual variation.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 38:144–146, **1952.** 3 figs. **DWB**—Proposals are outlined for showing numerically and graphically the annual variation of any element, with examples. *Subject Headings:* **1. Statistics in climatology 2. Annual variations.**—*C.E.P.B.*

4.6–202 551.583

Brooks, C. E. P., **What is happening to the weather?** *Harper's Magazine*, 206(1232):32–39, Jan. **1953. DLC**—Climatic changes of the past century—milder winters and hotter drier summers—and their social, biological and glaciological effects are summarized, and related to climatic variations since the Ice Age. The cause of worldwide temperature changes is sought in self-maintaining variations of the atmospheric circulation. The possible effects of increased fuel consumption are considered and the future outlook is discussed. *Subject Headings:* **1. Climatic changes 2. Climatic trends.**—*Author's abstract.*

4.6–203 551.583.2

Maksimov, I. V., **O vos'midesiatiletnem tsikle kolebaniĭ klimata zemli.** [On the eighty-year cycle of climatic variations on the earth.] *Akademiia Nauk SSSR, Doklady*, 86(5):917–920, **1952.** 4 tables, 11 refs. **DLC** –Periodogram analysis made for long series of climatic indicators (for example: ice conditions near Iceland, 1590–1930; Caspian sea level, 1820–1930; severity of winters in Western Europe, 1215–1905 and tree rings in California, 1295 B.C.–1905 A.D.). The average length of the quasiperiodic variations is about 80 years. Decreasing continentality in Europe and less ice in the Arctic observed from 1894 to 1934. Sunspot numbers show a similar variation of 80 years. Large solar activity associated with mild winters. *Subject Headings:* **1. Climatic changes 2. Solar influences 3. Tree rings 4. Arctic 5. Europe.**—*A.A.*

4.6–204 551.583.14:639(988)

Fristrup, Børge, **Die Klimaänderungen in der Arktis und ihre Bedeutung besonders für Grönland.** [Climatic changes in the Arctic and their importance especially for Greenland.]

Erdkunde, 6(4):201–212, **1952.** 9 figs., 61 refs. **DWB** –A general survey of the recent climatic change in Greenland and its consequences. Since 1900 winter temperatures have risen by 3–4°C, drift ice has decreased and most glaciers are in retreat—a detailed survey is given. Sea temperatures have risen and fisheries have spread Nward in Baffin Bay, but in Spitsbergen and Jan Mayen fishery has declined. Seal fishery has declined and is being replaced by sheep herding; whaling has increased. A reversal of the climatic trend would cause an economic crisis. *Subject Headings:* **1. Climatic trends 2. Fisheries 3. Greenland.**—*C.E.P.B.*

4.6–205 551.583.2:631

Richter, Gertraud, **Klimaschwankungen und Wüstungsvorgänge im Mittelalter.** [Climatic oscillations and desert advances in the Middle Ages.] *Petermanns Geographische Mitteilungen*, 96(4):249–254, **1952.** 15 refs. **DWB**—The difficulties of inferring climatic change before instrumental records are discussed, but FLOHN's work on winters and summers and MÜLLER's on wine yields agree on especially warm dry periods 1365–98 and 1420–28, cold 1429–65. The dry warm periods were one cause of desiccation of fields in central Europe, especially on sandy soils. Desiccation occurred mainly before 1430 and especially about 1375. Desiccation does not in general increase towards mountains. *Subject Headings:* **1. Historical climates 2. Desiccation 3. Central Europe.**—*C.E.P.B.*

MICROCLIMATOLOGY

See also: **Microclimatic regional studies, Franconia, Germany** (Weise), 4.6–40; **Potato storage; temp., atmos. composition** (Crook, Watson), 4.6–71.

4.6–206 551.584:63(749)

Biel, Erwin R., **Applied climatology.** *New York Academy of Sciences, Transactions*, Ser. 2, 14:336–340, June **1952. DWB**—After pointing out the value of microclimatological studies in air pollution, in conservation with special reference to preservation of forests and shelter belts and in frost protection, and the importance of reducing all nonsimultaneous meteorological data to standard periods, the author describes some microclimatic studies carried out by the Dept. of Meteorology of Rutgers University (New Jersey). These studies are concerned with the length of the growing season and the occurrence of frosts in New Jersey; the variability of the amount of the annual and growing season precipitation, exposure microclimate based upon measurements of different levels above ground on the northern and southern slopes of a hill, favorable atmospheric conditions for crop dusting, interdiurnal variability of temperature and the continentality of the climate of New Jersey. *Subject Headings:* **1. Applied climatology 2. Microclimatological research 3. Agricultural climatology 4. New Jersey.**—*I.L.D.*

4.6–207 551.584:8.03

Geiger, Rudolf, **El clima de las capas de aire cercanas al suelo; climatología especial.** [The climate of the layer of air near the ground; special climatology.] *Revista Meteorológica*, Montevideo, 10(38):91–128, July **1951.** figs. **DWB**—A translation of Chapts. 13–18 of GEIGER's "Das Klima der bodennahen Luftschicht." The Spanish translation was prepared from the English translation by JOHN LEIGHLY (1942) based on the first edition of the original (1927). The chapters translated deal with temperature, humidity and wind conditions in a layer of low vegetation, agricultural meteorology, the meteorology of peat land, general forest meteorology, and temperature and humidity conditions in the forest. Original figures are reproduced. The planned publication of a translation of more chapters is announced. (For complete English translation of 2nd rev. ed. of Geiger's book *see item* 2.1–158, Jan. 1951, *JAB.*) *Subject Headings:* **1. Microclimatology 2. Forests 3. Translations.**—*G.T.*

4.6–208 551.584.61

Landsberg, Helmut E. (*U.S.A.F. Cambridge Res. Center*), **Bad weather made better.** *Science Digest*, Chicago, April **1952.** p. 74–76. **DWB**—A popular broadcast (given over WGY, Schenectady, on the General Electric Science Forum Program) outlining the microclimatic factors which affect human activities, especially in regard to comfort in dwellings.

Several ways of using knowledge of microclimate to ameliorate undesirable factors such as cold winds, excessive radiation, frost, etc. are suggested. Cryptoclimatology, the study of the climate of closed spaces such as houses, greenhouses, cars, etc. is defined as a new branch of science. *Subject Headings:* **1. Microclimatic influences 2. Cryptoclimatology 3. Radio broadcasts.**—*M.R.*

4.6–209 551.584.61:628.81

Lenz, H., **Die Wohnraum-Heizung.** [Living-room heating.] *Die Umschau*, 53(2):40–43, Jan. 15, **1953.** 10 figs. **DLC**—In comfortable conditions a man at rest gives up about 100 KW/hr at a room temperature of 18–22°C depending on the supply of radiant heat. The most hygienic heating conditions are described and a number of new heaters and heating systems illustrated. *Subject Headings:* **1. Indoor climates 2. Heating and ventilating.**—*C.E.P.B.*

CLIMATIC CLASSIFICATION

See also: **Climatic influences** (Visher), 4.6–213.

4.6–210 551.585:551.577.3

Cucurullo, Oscar, Jr. (*Dir. Inst. Geográfico Militar, Santo Domingo*), **Una carta climática tentativa de la Isla de Santo Domingo.** [Tentative climatic chart for Hispaniola.] *Revista de las Fuerzas Armadas*, Ciudad Trujillo, 3(13):21–30, Jan./Feb. **1952.** 3 tables, 2 refs. Abstracted from reprint. **DWB**—The climatic index applied to data from 80 stations in the Dominican Republic and very inadequate information on Haiti is based upon Köppen's climatic classification and takes into account the annual total precipitation and the precipitation amount of the month with the least precipitation. Monthly and annual means of precipitation are tabulated for each station; their geographic location, altitude and climatic type is indicated. The results are summed up in a map showing 8 climatic types. *Subject Headings:* **1. Climatic classifications 2. Climatic charts 3. Precipitation variations 4. Hispaniola.**—*G.T.*

4.6–211 551.585:63:581.1(82)

De Fina, Armando L. and Garbosky, Antonio J. (*Inst. de Suelos y Agrotecnía, Buenos Aires*), **Difusión geográfica de cultivos índices en el Chaco Argentino y sus causas.** [Geographical spread of selected plants in the Argentine Chaco and its causes.] *Argentina. Instituto de Suelos y Agrotecnía, Tirada Interna*, No. 22, **1952.** 63 p. 19 maps, ref. **DWB**—Eighteen plants (12 perennial and 6 seasonal) are classified by applying an index of 1 to 4 points for each of these three properties: abundance of the plant, quantity of yield and degree of ripeness. Maps are presented showing the distribution of the 18 plants qualified by the 12-point index. The Chaco region is divided into 9 agroclimatic districts (shown on map) and the relative importance of each of the 18 plants in every district indicated in a table of qualitative values. The text comments on and amplifies the information contained in the maps. A table of approximate average temperature and precipitation in the 9 agroclimatic districts is included. *Subject Headings:* **1. Agro-climatic regions 2. Climate of the Argentine Chaco 3. Plant ecology 4. Argentine Chaco.**—*G.T.*

4.6–212 551.585.5:551.579

†Thornthwaite, Charles Warren (*Johns Hopkins U. Lab. of Climatology*), **The water balance in arid and semiarid climates.** Seabrook, N. J., Johns Hopkins University, Laboratory of Climatology, Feb. **1952.** 24 p. 13 figs., 3 tables, bibliog. p. 20–24. Mimeographed. **DWB**—Prepared for presentation at the International Symposium on Desert Research, Jerusalem May 7–14, 1952. A general review on potential evapotranspiration and the author's method for the calculation of the water balance. Examples for Beirut, Jerusalem and different places in the United States are given. Better results in semiarid regions can be gained by using a bookkeeping procedure for each single month or even day than applying it to climatological means. *Subject Headings:* **1. Evapotranspiration 2. Hydrologic cycle 3. Agricultural meteorology.**—*A.A.*

BIOCLIMATOLOGY

4.6–213 551.586 551.585

Visher, Stephen Sargent, **Climatic influences.** (In: Taylor, T. G. (*ed.*), **Geography in the twentieth century.** New York, **1951.** p. 196–220. bibliog.) **DWB**—This chapter begins with a review of the ideas and works of a number of scientists or authors, from HIPPOCRATES to HUNTINGTON, on the subject of the relation between climate or weather and human activity. Current ideas on climatic control (average and extremes of temperature, humidity, wind, storms, pressure, average, seasonal and extreme precipitation, sunshine, cloudiness, ozone, etc.) are treated in separate parts. Finally, the classification of climate, climatic diagrams (climagrams) and such techniques are discussed and illustrated. Emphasis is placed on the significance of extremes and variability of weather rather than on average conditions for human activity. *Subject Headings:* **1. Environmental influences 2. Bioclimatology 3. Climate control. I. Huntington, Ellsworth.**—*M.R.*

4.6–214 551.586:551.521.6

Cowan, Frederick P. (*Brookhaven Nat. Lab.*), **Everyday radiation.** *Physics Today*, N. Y., 5(10):10–16, Oct. **1952.** 2 figs., 5 tables, 16 refs. **DWB**—The author gives a rough quantitative survey of various types of radiation to which the human body is currently exposed. The types of radiation considered are cosmic rays, natural radioactivity, residual activity due to A-bomb explosions, radiation from radium-bearing luminescent paint and X-rays. The effect of rainfall and of inversions on the amount of radioactivity originating in atmospheric dust particles is discussed and graphically presented. *Subject Headings:* **1. Radiation effects 2. Radioactivity in the atmosphere 3. Human ecology.**—*G.T.*

4.6–215 551.586:37

Sargent, Frederick, II, **The need for a curriculum in bioclimatology.** *Journal of Human Ecology*, Crystal Lake, Ill., 1(7), **1951.** 5 p. **DWB**—Bioclimatology is defined as "the study of the influence of the meteorological and climatic environment on living things." The author lists periodicals containing bioclimatic data, places where bioclimatologists are employed (Office of the Quartermaster Corps., Wright Patterson, Ladd and Randolph Air Force Fields), and educational institutions where training in bioclimatology can be received (Johns Hopkins University and University of Illinois). The necessary qualifications for graduate study in bioclimatology are discussed. *Subject Headings:* **1. Bioclimatology 2. Bioclimatological institutions.**—*I.L.D.*

4.6–216 551.586:612

Hensel, Herbert, **Wärme- und Temperaturleitung in der lebenden Haut.** [Heat and temperature conduction in the living skin.] *Experientia*, Basel, 8(12):477–481, Dec. 5, **1952.** 9 figs., 18 refs. English summary p. 481. **DLC**—Thermo-electric instruments and methods for measuring heat conduction in the living skin are described and illustrated. Thermal conduction coefficient is 0.0012–.0023 cal/cm/sec/°C and thermal diffusion coefficient 0.0004–.0018 cm^2/sec. Curves and stereoscopic diagrams show transmission of heat at depths up to 2 mm. *Subject Heading:* **1. Skin functioning.**—*C.E.P.B.*

4.6–217 551.586:612

Koĭranskiĭ, B. B., **O povyshenii ustoĭchivosti organizma protiv pereokhlazhdeniia.** [Raising the resistance of the organism against chilling.] *Gigiena i Sanitariia*, 4:17–24, April **1952.** fig., 4 tables, 8 refs. **DLC**—Several Soviet studies on the physiological acclimatization to cold as indicated by the response of skin temperature, blood vessels, duration of chronaxie to successive exposure to local cold stimuli. Experimental evidence indicates that local exposure of extremities to cold generates resistance to chilling. Water temperature to which children of various ages should be exposed in order to develop resistance to cold are listed. *Subject Headings:* **1. Physiological climatology 2. Acclimatization 3. U.S.S.R.**—*I.L.D.*

4.6–218 551.586:612:519.24

Maruyama, H. and Momiyama, M., **Application of factor analysis to skin temperature distribution.** *Papers in Meteorology and Geophysics*, Tokyo, 2(3–4):311–314, Dec. **1951.**

fig., 2 refs., 4 eqs. **MH-BH**—The temperature values of twenty-two parts of the skin are used usually for the calculation of the average skin temperature. The authors discuss the possibility of reducing this number. An analysis of factors influencing the skin temperature is given (air temperature and age). *Subject Headings:* **1. Skin temperatures 2. Physiological climatology.**—*A.A.*

4.6–219 551.586:612:551.524.33:551.508.98(494)

*Thams, J. Chr. (*Locarno-Monti*), **Die Abkühlungsgrösse.** [Cooling power.] *Leben und Umwelt*, Aarau, Switzerland, 6(11):241–246, Aug. **1950.** 4 figs., 3 refs. **DLC**—A network of meteorological stations has been working in Switzerland since 1864 under a uniform observational program. Biometeorological investigations at present show that the usual meteorological observations are not sufficient for determining climatic characteristics. The value of cooling power is an important physiological factor. The instruments (katathermometer, frigorimeter) constructed for measurement of cooling power are described. Monthly mean air temperatures and values of cooling power are analyzed for three stations (Locarno-Monti, Basel and Davos). *Subject Headings:* **1. Meteorological networks 2. Cooling power 3. Temperature variations 4. Switzerland.**—*N.T.Z.*

4.6–220 551.586:612

U. S. Weather Bureau, **Weather and human behavior cycles.** Oklahoma City, Feb. 11, **1952.** 5 p. Typescript. **DWB**—The anonymous author of this article backs up his plea for more intensified and accurate collection of weather data with an uncritical review of Dr. Raymond E. Wheeler's (Editor of *Journal of Human Ecology*) use of weather data to explain the rise and fall of civilizations and business cycles, and to derive so-called rainfall cycles. *Subject Headings:* **1. Human ecology 2. Wheeler, Raymond H.**—*I.L.D.*

4.6–221 551.586:612 551.524.1

†Wachter, Heinz, **Neuere Erkenntnisse über biometeorologische Wärmewirkungen.** [New information about biometeorological heat effects.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 38:412–415, **1952.** 5 figs., 20 refs. **DWB**—Previous investigations on cooling rate are summarized. A new instrument to record the microvariations of temperature at head height is described, consisting of 40 very thin thermocouples in a 2 kg metal sphere. A variety of records are reproduced, obtained in the open and in a room. *Subject Headings:* **1. Cooling power 2. Temperature microvariations.**—*C.E.P.B.*

4.6–222 551.586:612.275.11

Hawickhorst, Heinrich, **Medizinische Beobachtungen in Höhen über 5000 meter.** [Medical observations at heights above 5000 m.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, No. 6:16–17, **1951.** 3 refs. **MH-BH**—Summarizes observations on pulse rate, blood pressure, breathing, healing of cuts, etc., in Bolivian Andes, and effect of drugs. Regional differences in occurrence of mountain sickness show that besides height, other factors (electric, ion-content, radioactivity, UV radiation) are important. *Subject Headings:* **1. Mountain sickness 2. Medical climatology.**—*C.E.P.B.*

4.6–223 551.586:616

Armstrong, Charles, **Atmospheric conditions and the spread of poliomyelitis.** *American Journal of Public Health*, 41(10):1231–1237, **1951.** **DLC**—On the basis of the weekly incidence of a total of poliomyelitis which occurred in 1950 in Washington, D. C. and adjoining Virginia and Maryland counties and the prevailing atmospheric and relative humidity reduced to 90°F, the author constructs frequency curves for each of the above variables and concludes that a causal relationship exists between poliomyelitis infection and atmospheric humidity. Dry air at 90°F tends to prevent infection with poliomyelitis in a population while a moist atmosphere at the same air temperature tends to favor its spread. Relative humidity of 27–28% air temperature of 90°F represents a critical level below which poliomyelitis spreads

with difficulty. *Subject Headings:* **1. Medical climatology 2. Poliomyelitis 3. Washington, D. C.**—*I.L.D.*

4.6–224 551.586:646

Migaĭ, K. V., **Spetsodezhda dlia zashchity cheloveka ot nizkikh temperatur vozdukha.** [Special clothing for protection of man against low atmospheric temperatures.] *Gigiena i Sanitariia*, Moscow, 6:23–29, June **1952.** 3 figs., table. **DLC**—The heat protective properties of clothing made of fur and of wadding are compared and a table of the coefficients of heat loss $\left(\frac{\text{K.cal}}{\text{m}^2/\text{hr}/\text{C}^\circ}\right)$ of various furs and mixtures of furs with wadding is presented. Soviet studies on heat protective properties of cotton netting worn next to the skin are summarized. The heat resistance $\left(\frac{\text{m}^2.\text{hr}.\text{C}^\circ}{\text{K.cal}}\right)$ of cotton netting in which the thickness of the thread was 0.6 mm and of the net 1.3 mm and the size of the mesh ranged from 20×20 mm to 4×4 mm. Also cotton netting with thickness of 3 mm, woollen netting with a thickness of 1.5 mm and cotton netting having a mesh size of 10×10 mm and a thickness of 3–3.5 mm were investigated. Clothing made from such cloth should be overalls with a closed collar and with buttoned sleeves and trousers. Temperature of skin and of air beneath the clothing are suitable criteria for measuring the heat insulating value of clothing. Cotton clothing is inferior somewhat to wadding in heat insulating properties. *Subject Headings:* **1. Clothing climate 2. Bioclimatology 3. Cotton cloth 4. U.S.S.R.**—*I.L.D.*

UPPER AIR AND SYNOPTIC CLIMATOLOGY

4.6–225 551.587:551.555.3

Georgii, Walter (*Mendoza*), **Beitrag zur Aerologie von Mendoza.** [Contribution to the aerology of Mendoza.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 36, **1952.** 12 p. 12 figs., 8 tables. **MH-BH**—A general description of the climate of Mendoza, which is largely a consequence of its position at the foot of the Andes, and data on the annual course of precipitation along lat. 32–33°S, on mean seasonal values of free air temperature, temperature extremes during summer and winter and mean temperatures of the air masses over Mendoza at various elevations are given. The process of weather formations as a consequence of air mass characteristics is described. A detailed analysis of the formation and characteristics of the zonda or föhn is given. The mountains near Mendoza influence the free air temperature in such a way that the föhn warming of the air from 2.0 to 5.0 km is so great in winter that there is almost no difference in temperature at these heights between summer and winter. Airplane flights up to a height of 8 km indicate two distinct phases of the zonda, namely: a stable and unstable föhn phase. *Subject Headings:* **1. Aerological studies 2. Föhn winds 3. Zonda 4. Mendoza, Argentina.**—*I.L.D.*

4.6–226 551.587

*Georgii, Walter, **Contribución a la aerología de la República Argentina.** [Contribution to the aerology of Argentina.] *Mendoza, Argentina. Universidad Nacional de Cuyo. Departamento de Investigaciones Científicas, Anales*, 1(1):1–70, **1952.** 31 figs., 24 tables. In Spanish; Spanish and German summaries. **DWB**—The author has taken a few airplane soundings (less than 100) made between 1943 and 1949 in the Buenos Aires, Córdoba and Mendoza regions and systematically constructed a picture of the aerological conditions in these zones of Argentina lying in the lee of the high Cordillera. The actual seasonal temperatures and lapse rates up to 7 km, statistics on inversions and isothermal layers, false inversions, air masses and their characteristics, frontal weather conditions, potential temperatures, pressure distribution, winds, vertical currents (even actual velocities are tabulated and depicted graphically), föhn, pampero and zonda conditions, cloud structure (from special cloud flights), lee eddies between Aconcagua and Mendoza, etc., are analyzed statistically and graphically. A separate analysis is given for the Mendoza region and the Buenos Aires-Córdoba region. *Subject Headings:* **1. Aerological studies 2. Upper air climatology 3. Argentina.**—*M.R.*

4.6–227 551.588.4(439.1)

†*Botvay, Károly, **Adatok a tavak és folyók parti környezetének éghajlatához.** [Contributions to the knowledge of climate of the shores of lakes and rivers.] *Időjárás*, 56(5/6): 131–144, May/June **1952.** 7 figs., tables, 12 refs. Russian and French summaries p. 197–198. **DWB**—Micrometeorological measurements made by the author with a view to determining the influence of large masses of water on immediate off-shore surroundings are reported. The measurements were carried on during several weeks in Aug.–Sept. 1949 near Lake Balaton and on Sept. 25, 1949 near the Danube. A portable Assmann type aspiration psychrometer and an anemometer were used and values were obtained for temperature, humidity, wind and cloudiness. Minute descriptions are given of sites and measuring methods and results are tabulated and presented in graphs. It was found that humidity is increased and rise in temperature moderated in the vicinity of a lake or river, especially during near-zenithal positions of the sun. *Subject Headings:* **1. Coastal climates 2. Lakes and rivers 3. Micrometeorological data 4. Lake Balaton, Hungary 5. Danube River, Hungary.**—*G.T.*

4.6–228 551.589.5:551.513

Namias, Jerome (*U. S. Weather Bureau, Wash., D. C.*), **The annual course of month-to-month persistence in climatic anomalies.** *American Meteorological Society, Bulletin*, 33(7): 279–285, Sept. **1952.** 5 figs., 7 refs. **MH-BH**—The annual march of month-to-month persistence in anomaly of temperature, precipitation, and mid-tropospheric flow pattern over the United States is examined for approximately the past decade. The data indicate a tendency for persistence in all three elements during all adjacent pairs of months except from April to May and from October to November when great and often abrupt transitions of long period regimes occur. These empirical findings are related to a "self-developmental" hypothesis presented by the author in a recent paper and designed to explain the evolution of climatic anomalies. An analysis of the year-to-year behavior of persistence suggests possible gradual secular trends which might be related to sunspots, but the evidence is inconclusive. Finally, persistence is related to zonal index, and here there is a suggestion that during the colder parts of the year low index periods are more persistent than high. *Subject Headings:* **1. Persistence 2. Climatic anomalies 3. Zonal index.**—*Author's abstract.*

MISCELLANEOUS APPLICATIONS

SOLAR INFLUENCES

4.6–229 551.590.21:551.510.535

Kamiyama, Hiroshi (*Geophysical Inst., Tohoku Univ.*), **The variation of effectiveness of the solar eruption according to its location.** *Japan. Science Council. Ionosphere Research Committee, Report of Ionosphere in Japan*, 5(4):182–183, **1951. DWB**—The effectiveness of solar eruptions upon the ionosphere is most remarkable in the central region (30°E–10°W) and is reduced by half beyond 50° meridians. *Subject Headings:* **1. Solar influences 2. Ionosphere.**—*A.A.*

4.6–230 551.590.21

McIntosh, D. H., **Solar and terrestrial relationships.** *Meteorological Magazine*, London, 82(967):11–15, Jan. **1953.** 7 refs. **MH-BH**—A critical discussion of the relations between day-to-day solar and troposphere changes finds no clear proof of a direct link between them. It is suggested that "the ozone layer represents the only possible link between the sun's variations and surface weather reactions." *Subject Heading:* **1. Solar influences.**—*C.E.P.B.*

4.6–231 523.7:551.510.5:551.590.21

*†Nicolet, Marcel (*Met. Inst., Belgium*), **Solar physics and the atmosphere of the earth.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 182–225. figs., tables, refs.) **DLC**—This thorough review of those aspects of solar physics which are associated with upper atmospheric phenomena, surveys the following topics: determination and values of the solar constant;

radiations of a quiet and of an active sun; ultraviolet photospheric radiation; coronal and chromospheric radiation; number of photons available in the upper atmosphere; fall-force transitions including coronal, chromospheric and general emission; action of solar activity; ultraviolet emission of a quiet sun as determined by the models of WOOLEY and ALLEN; absorption coefficients of atmospheric constituents including absorption coefficients between $\lambda = 3000$ Å and $\lambda = 910$ Å; absorption coefficients in the ultraviolet regions for $\lambda = 910$ Å and the X-ray absorption coefficients; interrelation between solar radiation emission and its absorption and the earth's atmosphere, and twilight phenomena of solar radiation. The article contains numerous graphs and tables and a selected bibliography, the items of which are classified according to the topics discussed. *Subject Headings:* **1. Solar physics 2. Upper atmosphere 3. Atmospheric absorption 4. Solar radiation.**—*I.L.D.*

VISIBILITY

See also: **Condensation nuclei and development of radiation fog** (Best), 4.6–162.

4.6–232 551.591:551.501:535.7

Blackwell, H. Richard (*Univ. of Michigan*), **Studies of psychophysical methods for measuring visual thresholds.** *Optical Society of America, Journal*, 42(9):606–616, Sept. **1952.** 8 tables, 9 refs. **DWB**—The comparative adequacy of various psychophysical procedures employed to measure visual thresholds has been investigated. Adequacy is defined by: (a) reliability; (b) *inferred validity;* and (c) sensory-determinacy. Procedural variables which have been studied include the response utilized by the subject to indicate discrimination; the number, spacing, and order of light intensities presented in the measurement series; the general attitude which the subject adopts; and the extent to which the subject is given knowledge of the correctness of his responses. Psychophysical procedures have been found which appear to have optimum reliability, validity, and sensory-determinacy. *Subject Headings:* **1. Visibility 2. Visual acuity.**—*From author's abstract.*

4.6–233 551.591:551.501

Middleton, W. E. Knowles and Mungall, A. G. (*Natl. Res. Council, Ottawa, Canada*), **On the psychophysical basis of meteorological estimates of "visibility."** *American Geophysical Union, Transactions*, 33(4):507–512, Aug. **1952.** 3 figs., 2 tables, 9 refs., 2 eqs. **MH-BH**—The least contrast between a "visibility mark" and its background which brings the mark within the visual range of an observer was measured directly by means of a specially built photoelectric telephotometer which is described briefly. Measurements of the contrast were made by pointing a photoelectric telephotometer at a mark and at the sky adjacent to it. The mark was chosen by a meteorological observer as being just within the visual range. The frequency of contrast observations by class intervals and the median contrast for each mark for which the number of observations was greater than nine are presented in tables. The results of 1000 observations show a range of values of 20:1. *Subject Headings:* **1. Visibility measurement 2. Visual acuity.**—*From authors' abstract.*

4.6–234 551.591:629.35

U. S. Weather Bureau, **Final approach visibility studies.** U. S. Weather Bureau, Project ANDB 4.14, Progress Report, Fiscal year 1952, Pt. 1, June 30, **1952.** 43 p. 13 figs., table, refs. **DWB**—This report describes in detail the first phase of an instrument and observation project designed to increase efficiency of use of landing strips at airports by improving visibility reports and measurements which enter therein. The project is a joint operation of the U. S. Weather Bureau (Observations Section under B. C. HAYNES) and the Air Navigation Development Board (ANDB). The period covered is Oct. 10–Dec. 31, 1951. Instruments used for measuring ceiling and visibility at Washington National Airport and Silver Hill, Maryland, an analysis of the problems involved, limitations of instruments, and plans for investigations in the field with available equipment are discussed and well-illustrated wherever possible. *Subject Headings:* **1. Aircraft landing aids 2. Visibility measurement techniques 3. Slant visibility 4. Washington National Airport. I. U. S. Air Navigation Development Board II. Project ANDB 4.14 III. Haynes, B. C. IV. Harrison, L. P.**—*M.R.*

OPTICAL PHENOMENA

See also: **Refraction table** (Sadler), 4.6–32; **Chemosphere** (Kaplan), 4.6–73.

4.6–235 551.593.54

Schieldrup Paulsen, H., **"Blå" sol.** ("Blue" sun.) *Naturen*, Bergen, 76(11):336–341, **1952.** fig. **DWB** —The blue sun observed in Scotland on Sept. 25, 1950 and the day after at different locations in Sweden, Denmark, Germany, France, Switzerland and Portugal had these characteristics: 1) through a "veil" (cirrostratus), the sun could easily be observed with the naked eye, and varied in color from blue-white to cobalt-blue; 2) the "veil" varied in density—at times resembling a drifting veil in front of the sun's disk; 3) at some places around the sun (about 60°) the sky had a greyish color heavily mixed with reddish-brown; 4) no halo; 5) sun-lit objects seemed light blue to violet, throwing but weak shadows and 6) in the evening the moon appeared with a blue-violet tinge. Special measurements of radiation determined abnormal air pollution until Oct. 5, supposedly caused by volcanic activities and/or by a heavy forest fire in northern Canada. An analysis of the synoptic charts may support JENNE's suggestion of two layers: one upper dust layer at about 13,000 m and a layer of ice particles at about 9000 m. ÅNGSTRÖM's theory of a refraction effect is opposed by the author who suggests a scattering phenomenon causing a diffuse distribution of the red rays, whereas the blue ones penetrated, but in reduced intensity. *Subject Headings:* **1. Blue sun 2. Smoke pall—Sept. 1950.**—*W.N.*

4.6–236 551.593.51

Selwood, N. D., **Green flash. Pacific equatorial waters.** *Marine Observer*, 22(158):198, Oct. **1952. MH-BH**—Two observations: 1) as sun disappeared behind Cu a watery green flash spread along top edge of cloud and 2) sun setting behind low StCu, a light green flash changed suddenly to light blue. *Subject Headings:* **1. Green flash 2. South Pacific.**—*C.E.P.B.*

4.6–237 551.593.55:551.576

*Lauscher, Friedrich, **Om skydekkets innvirkning på demringstiden i Norge.** [Influence of cloud cover on twilight in Norway.] *Naturen*, Bergen, 76(4):109–118, **1952.** fig. **DWB**—The problem of visual observations of the duration of twilight is reviewed. Comparison of central European values with Norwegian ones shows that the former can be used in Norway. Tables and curves presenting the relative twilight (r.d.) are given in percent, using MOHN's value (7.35°=100%). It is found that: 1) the length of twilight varies with geography and time of the year, that 2) the time period is shortened by nine minutes (in Central Europe) when the sky is entirely overcast, or when an extended storm front appears in the west, even if there is a clear sky above the observational site (explained by the shadow of the cloud mass itself), 3) the light situation cannot be judged by the amount of clouds and 4) dry snow (ground) increases light by: r.d. snow=r.d.+1/4(100−r.d.), wet snow only about half. An additional method (confirmed by observations to evaluate the duration of twilight under varying weather and local geographical conditions) is described. Influence of forest on twilight duration is suggested. *Subject Headings:* **1. Twilight duration 2. Cloud effects.**—*W.N.*

4.6–238 551.593.63

Krylov, P. A., **Solnechnye oreoly, nabliudaemye na vysotakh.** [Solar halos observed at high altitudes.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geofizicheskaia*, 2:81–84, **1952.** fig., tables. **DLC** —Ten airplane flights were made near Moscow in August and Sept. 1948 in order to photograph solar halos. A hand operated motion picture camera in which the film was illuminated through a tube replacing the objective was used. A diagram of the tube is shown. The elevations at which the photographs were made ranged between 9.20 and 12.60 km. Data on atmospheric pressure, zenith position of the sun during photographing, relative brightness of the halos at various heights above sea level, etc. are given. It is concluded that solar halos exist at elevations higher than the troposphere and that their intensity varies considerably from day to day. *Subject Headings:* **1. Halo observations 2. Halo photography 3. Moscow Region.**—*I.L.D.*

RADIOACTIVITY IN THE ATMOSPHERE

See also: **Ionospheric thermal radiation at radio frequencies** (Pawsey, McCready, Gardner), 4.6–83; **Reflection coefficient of exponential layer** (Shmoys), 4.6–89.

4.6–239 551.594.14:551.574.1

Garrigue, Hubert, **L'invasion d'air radioactif d'origine atomique et son influence sur les précipitations atmosphériques.** [The invasion of air which is radioactive from atomic origin and its influence on precipitation.] *Académie des Sciences, Paris, Comptes Rendus,* 232(10): 1003–1004, March **1951. DWB**—The author concludes that although the principal area of contamination from an atomic explosion is rather restricted, radioactive condensation nuclei will cover a large portion of the globe. *Subject Headings:* **1. Atomic explosions 2. Radioactive condensation nuclei 3. Radioactivity in the atmosphere.**—*G. C. Bristow.*

4.6–240 551.594.14:551.574.1:551.509.67

Garrigue, Hubert, **Recherches sur la radioactivité de l'air libre.** [Research on the radioactivity of free air.] *Académie des Sciences, Paris, Comptes Rendus,* 233(16):860–862, Oct. 15, **1951.** refs. **DWB**—Data obtained through measurements from the ground and in flight for the period March through May 1951 are presented and claimed to confirm the existence of a complex radioactive particle for a period of several hours, which had been anticipated as early as in 1946. For the first time this particle could be observed from the ground. Other data chosen from the period 1946 through 1951 are arranged with a view to proving that the abundant precipitation lately noticeable over France (and definitely claimed by the author to be the result of condensation nuclei emerging from atomic explosions) washed out radioactive particles from the lower atmosphere. Artificial precipitation is suggested as a possible means of defense against air pollution from radioactivity. *Subject Headings:* **1. Radioactivity in the atmosphere 2. Air sampling and analysis 3. Condensation nuclei 4. Artificial precipitation.**—*G.T.*

4.6–241 551.594.14:551.508.99

*†Siksna, R., **Radioactivity induced from the atmospheric air, investigated with the photographic emulsion method.** *Arkiv för Geofysik,* Stockholm, 1(2–4):123–147, **1951.** 18 figs., 8 tables, refs. English summary p. 146–147. **MH-BH**—This general survey shows that the combined "activation-photographic method" can give facts not possible by other methods (e.g., ionometrical, emanometrical, absorption). The method is described in detail along with further developments and some guiding principles. The experimental data are discussed. *Subject Headings:* **1. Radioactivity in the atmosphere 2. Radioactive measuring devices 3. Stockholm, Sweden.**—*W.N.*

4.6–242 551.594.14:551.515.8

U. S. Office of Naval Research, London, **Atmospheric radioactivity following nuclear explosions.** *U. S. Office of Naval Research, London, Technical Report ONRL-66-52,* July 3, **1952.** [5 p.] 3 figs. **DWB**—Brief note on measurement of β-activity of rain water, made by employees of Kodak-Pathé at Paris, from Nov. 1951 through Feb. 1952, following nuclear explosions in Nevada on Oct. 22, Nov. 5 and Nov. 19, and on activity of atmospheric dust observed during the same period. Radioactivity curves of rainwater and dust are presented for the four months and show peak values about ten days after nuclear explosions and amounts reaching 20 times normal during Nov. and Dec. A map indicating the paths of air masses at 700 and 500 mb levels, as traced back from Paris to Nevada by M. Genève of the Météorologie Nationale, is reproduced. It is pointed out that the French Meteorological Office is setting up a network in Norway, France, Morocco and French West Africa for further observations of radioactivity. *Subject Headings:* **1. Radioactivity in the atmosphere 2. Air mass movements 3. Atomic explosions. I. Hyde, W. Lewis II. France. Météorologie Nationale.**—*G.T.*

ELECTRICAL PHENOMENA

4.6–243 551.594.2:551.515(492)

Feteris, P. J., **Het peilen van bliksemhaarden met behulp van richting en afstand van verticale ontladingen.** [The location of lightning with the aid of the azimuth and distance of

vertical lightning strokes.] *Hemel en Dampkring*, 50(11):196–200, 1952. 2 figs. **DLC**—It was discovered in 1916 that the movement of bad weather systems and the general circulation itself could be determined by following lightning storms across the country as easily as by following balloons. Radar has now simplified this process. A network of 20 amateur lightning observation stations is maintained by the KNMI in Holland. A map is presented on which location of vertical lightning strokes are plotted, showing an example of analysis by this method. *Subject Headings:* **1. Lightning tracking 2. Atmospheric circulation 3. Thunderstorm tracks 4. Netherlands.**—*M.R.*

4.6–244 551.594.21

Komel'kov, V. S., **Raspredelenie elektricheskikh zariadov v oblakakh.** [Distribution of electric charges in clouds.] *Meteorologiia i Gidrologiia*, No. 8:17–, Aug. **1948. DLC**—The author presents a report on measurements of corona currents, carried out in 1941 and 1942 by means of the ascent of captive balloons with a metallic cable. *Subject Heading:* **1. Thunderstorm electricity.**—*C.K.*

4.6–245 551.594.22

Heybrock, Werner, **Beobachtung von Perlschnurblitzen.** [Observation of bead lightning.] *Meteorologische Rundschau*, 5(9/10):186, Sept.–Oct. **1952. DWB**—On Aug. 30, 1952 at Lahr (Black Forest) a crumpled cloud—cloud discharge persisted for an unusual time and broke up into a string of beads lasting 3 sec. *Subject Headings:* **1. Bead lightning 2. Black Forest, Germany.**—*C.E.P.B.*

4.6–246 551.594.22

Rare form of lightning. *Marine Observer*, 22(157):123–124, July **1952.** fig. **DWB**—July 30, 1951, 6°2′N, 81°23′W, above Cu near horizon "a small sector of the sky was brilliantly illuminated and, on an average, immediately after every second flash, lines of orange coloured flashes shot up to an altitude of 15°, terminating in a layer of St." *Subject Headings:* **1. Electrical discharges 2. Lightning.**—*C.E.P.B.*

AURORAS

4.6–247 551.594.51:551.508.85

Hellgren, Gösta and Meos, Johan (*Res. Lab. of Electronics, Chalmers Univ. of Techn., Gothenburg*), **Localization of aurorae with 10 m high power radar technique, using a rotating antenna.** *Tellus*, 4(3):249–261, Aug. **1952.** 18 figs., 11 refs. **MH-BH**—The paper describes the 10 m high power recorder with a rotating antenna that is used since May 1951 for the localization of aurorae at the Radio Wave Propagation Laboratory of the Kiruna Geophysical Observatory (67°.8N, 20°.5E). Continuous observations during the time of May 1951–March 1952 have disclosed periods of auroral activity. The preliminary results from these observations indicate that there is a good correlation between the auroral activity, the magnetic activity, and the appearance of the N_I-layer, a special type of sporadic E ionization often appearing in connection with magnetic bays and supposed to be caused by the same ionizing agent as the aurora. The distribution in range and bearing of the recorded aurorae agrees with the simple theory that most of the radio wave scattering comes from those points where the radar beam is perpendicular to the surface of the auroral discharges. The calculated height distributions of the reflection centres have maxima around 120 km. *Subject Headings:* **1. Auroras 2. Auroral recorders.**—*Authors' abstract.*

RADIO METEOROLOGY

4.6–248 551.594.7:550.38

Lejay, Pierre; Ardillon, Jeanne-Marie and Bertaux, Gérard, **Relation entre le magnétisme et la propagation des ondes radioélectriques entre Washington et Bagneux.** [Relation between magnetism and the propagation of radioelectric waves between Washington and Bagneux.] *Académie des Sciences, Paris, Comptes Rendus*, 232(22):1975–1976, May **1951.** 2 figs. **DWB**—A comparison of the mean daily values of the field of United States radio station WMV with the daily magnetic disturbances determined at Bagneux indicates the

existence of a close correlation between the quality of reception and magnetic disturbances so far as North America and Europe are concerned. *Subject Headings:* **1. Terrestrial magnetism 2. Radio wave propagation 3. Bagneux, France 4. Washington, D. C.**—*I.L.D.*

4.6–249 551.594.7:621.396.029.6

Townes, C. H. (*Columbia Univ.*), **The present status of microwave spectroscopy.** *New York Academy of Sciences, Annals*, 55:745–750, Nov. 21, **1952.** 2 figs., 14 refs. **DWB**—Microwave spectroscopy has been accomplished from 20 cm to 1.10 mm. No known electronic technique of generation promises to produce waves shorter than 1 mm. Much improvement is to be expected, however, in the region 1 to 5 mm within the next few years. Sensitivity increases with wave length; at 1 cm wave length it is now about one part in 10^9 absorption per cm pathlength. An improvement by an order of magnitude can be achieved by decreasing the speed of observation. The resolution limit is essentially set by the Döppler effect. Frequencies can be measured in some cases to one part in 10^7. Absolute absorption intensities have been measured with an accuracy of about 5%; relative intensities to about 2%. Improvement should be possible. Theoretical determination of frequencies and line intensities are of the accuracy of microwave measurements. In general, however, theory is lagging behind measurements; for example in determination of line-widths and line shape. Accurate measurements of line widths are now possible under low enough pressures that two-body collisions dominate, but nonadiabatic collisions are typical in the microwave region, so that the results cannot be directly applied to optical and infrared spectroscopy. Another major difficulty lies in finding cases where one type of molecular interaction can be studied in isolation. *Subject Headings:* **1. Microwave spectroscopy 2. Infrared spectroscopy 3. Line intensities.**—*L. Kaplan.*

4.6–250 551.594.7:551.510.535

Watts, J. M. (*Central Radio Prop. Lab., Wash., D. C.*), **A note on the polarization of low frequency ionosphere echoes.** *Journal of Geophysical Research*, 57(2):287–289, June **1952.** 3 refs. **MH-BH**—The use of a low frequency pulse transmitter in conjunction with antennas for emitting waves of nearly circular polarization gave additional information on the state of polarization of vertically incident reflected waves from the ionosphere. Automatic switching of sense of rotation provided a means of "tagging" portions of complicated h-t recorder traces if the amplitude response varied with incident wave polarization sense. *Subject Heading:* **1. Ionospheric reflection.**—*Author's abstract.*

4.6–251 533.1:551.594.9

Kober, Hermann, **Die Absorption in einem Elektronen-Gas-Gemisch.** [Absorption in an electron-gas mixture.] *Annalen der Physik*, 6th Ser., 11(1):1–11, **1952.** fig., 7 refs., 6 eqs. **DLC**—The influence of damping by collisions on the polarization of a mixture of electrons and gas in an alternating electric field is discussed theoretically. A first approximation is deduced for the non-linear effect of absorption. *Subject Heading:* **1. Polarization.**—*C.E.P.B.*

ACOUSTICAL PHENOMENA

4.6–252 551.596.1:534.22

Hixson, E. L., Gerhardt, J. R. and Straiton, A. W., **A device for continuous and instantaneous measurement of the velocity of sound over considerable distances.** Texas. University. Electrical Engineering Research Laboratory, Contract N6onr-266, Task Order 2, Report No. 21, Nov. 1, **1948.** 15 p. 2 tables, 4 figs., 13 eqs. **DWB**—An instrument developed for measuring sound propagation velocity, by introducing impulses created in a speaker and in a microphone into an oscilloscope is described and presented on schematic drawings. Measurements using a sound pulse frequency of 1,000 cycles/sec and a repetition rate of 10 cycles/sec are reported and their results presented in terms of temperature and wind velocity components. *Subject Headings:* **1. Sound velocity measurement 2. Acoustical propagation. I. Texas. University. Electrical Engineering Research Laboratory II. Contract N6onr-266.**—*G.T.*

4.6–253 551.596.1:551.510.53:551.507.362

†Temple University. Research Institute, **Research in the physical properties of the upper atmosphere with V-2 rockets.** Contract W19-122-ac-12, Report No. 12, Aug. 1, **1951.** 32 p. 40 refs., 77 eqs. **DWB**—This report is a useful review of the literature on attenuation of sound in air, carried out by R. GOLDMAN. The classical theory gives $\alpha\lambda^2 = C$, with $C = 1.58.10^{-4}$ [cm], α = absorption coefficient, λ^2 = wave length. The previously observed values for the coefficient C are 2.10^{-4} to $3.6.10^{-4}$ [cm]. Curves are given showing the intensity absorption as a function of frequency, temperature and percentage of water molecules in the air. Special attention is turned to absorption at low pressures. *Subject Headings:* **1. Upper atmosphere research 2. Sound absorption 3. V-2 rockets. I. Bohn, Jacob Lloyd II. Nadig, Francis H. III. Goldman, R. IV. Contract W19-122-ac-12.**—*A.A.*

PLANETARY ATMOSPHERES

4.6–254 523.3

KHabakov, A. V., **O nalichii v proshlom sledov atmosfery u sputnika zemli.** [On the presence in the past of traces of an atmosphere on the moon.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Izvestiia,* 84(3):315, May/June **1952.** 6 refs. **DLC**—The author reiterates previous conclusions of his, based upon photographs of the lunar surface taken with ultraviolet and range filters, that color shades of certain regions are traces of chemical weathering and also of oxidation as a consequence of the liberation of gases during eruption and hence the reddish color is evidence of the past presence of gases and water on the moon. *Subject Heading:* **1. Lunar atmosphere.**—*I.L.D.*

4.6–255 523.4:535.568

Rubashev, B. M., **Sledy atmosfery na Merkurii.** [Traces of an atmosphere on Mercury.] *Priroda,* Moscow, 40(11):47–48, **1951.** 10 refs. **DLC**—The physical conditions on Mercury preventing the existence of an atmosphere are stated and the various attempts, the application of the polarimetric method for studying planetary atmospheres, are described and the investigations of A. DOLLFUS which indicate the existence of traces of an atmosphere on Mercury are discussed in detail. *Subject Headings:* **1. Planetary atmospheres 2. Mercury 3. Polarimetry. I. Dollfus, A.**—*I.L.D.*

4.6–256 523.4:629:612.275.11

Haldane, J. B. S. (*London Univ.*), **Biological problems of space flight.** *British Interplanetary Society, Journal,* 10(4):154–158, July **1951. DLC**—An informal talk given to the Brit. Interplanetary Soc. on April 7, 1951 is summarized. In his lecture, a combination of scientific facts, imaginative hypothesis and humorous conjecture, these questions are raised: "How would man live in a space ship," "How would he live on another planet," and "What kind of life would he expect to meet there." In the course of seeking an answer to these questions, the lecturer touched on various side issues such as whether the Milky Way is a living organism, etc. The discussion which followed the speech is also reported. *Subject Headings:* **1. Interplanetary flights 2. Planetary climates 3. Space medicine.**—*G.T.*

4.6–257 523.4:778.3

Hess, Seymour L., **Color changes on Mars.** (In: Flagstaff, Arizona. Lowell Observatory. **The project for the study of planetary atmospheres,** Contract AF 19(122)-162, Annual Report, Sept. **1950.** p. 34–38. chart, refs.) Mimeographed. **DWB**—The author discusses the hypothesis of plant life on Mars and attempts to verify it by investigating the relationship between changes in the opacity of the "blue haze," which absorbs UV radiation, and change in color of the dark surface markings. Color filter photographs which were taken during the oppositions of 1939 and 1941 and which were in the visible red of the spectrum were used to test the effect of blue haziness upon color of markings and a confirmatory result was obtained in 1941 but not in 1939. *Subject Headings:* **1. Planetary atmospheres 2. Astrophotography 3. Mars. I. Flagstaff, Arizona. Lowell Observatory II. Contract AF 19(122)-162.**—*I.L.D.*

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON STRATOSPHERIC AND IONOSPHERIC WINDS (ABOVE 100 MB)

By: *Gwynne J. Evans and Mollie P. Kramer*

EXPLANATORY NOTE

The following bibliography on winds above approximately 100 mb is the second in a series ppearing in *Meteorological Abstracts and Bibliography*. For references to **High Level Winds** (500-00 mb) and to the **Jet Stream,** see the May and July 1953 issues, respectively.

Included in this bibliography are over one hundred references to high level winds measured hiefly by means of balloon soundings, electronic techniques and cloud movement observations. Material has been selected from the widest possible distribution of geographical locations for which tratospheric and ionospheric winds had been measured and results published. A few references to terature on winds at lower levels (5–16 km) which were omitted from the May 1953 bibliography re included in this compilation in order that the literature covered on winds above 5 km will be as omplete as possible if anyone wishes to integrate the three bibliographies.

The asterisk (*) is used to denote a source of data, the dagger (†) a good source of references nd the symbol (§) a source of synoptic material.

SUBJECT OUTLINE

Observational and computational methods
- Balloon soundings
  - Pilot balloons, 4F–3, –9, –19, –30, –40, –77, –81, –84, –116
  - Radar and Rawin, 4F–39, –46, –59, –67, –75, –77, –79, –84, –85, –91, –94, –98, –101, –110, –113, –114, –118
  - Radiosondes, 4F–21, –46, –50, –55, –68, –85 to –87
  - Constant level balloons, 4F–4, –82
  - Sounding balloons, 4F–7
  - Manned balloons, 4F–15
- Electronic techniques [other than balloon tracking]
  - Radio pulse techniques [ionospheric movements], 4F–36, –37, –42, –48, –51, –57, –105, –109, –110, –112, –120, –122
  - Radioastronomic measurements [radio stars], 4F–102, –107, –115
  - Döppler shift in radio echoes, 4F–60, –71, –100
- Pressure distribution, 4F–29, –41, –55, –56
- Cloud movement
  - Noctilucent and mother-of-pearl clouds, 4F–6, –12, –14, –16, –21, –45, –52, –97, –106
  - Ionospheric drift, 4F–37, –51, –57, –72, –93, –95, –97, –121
  - Smoke drift, 4F–33, –44, –52
  - Meteor train observation, 4F–1, –2, –5, –11, –16, –25, –28, –32, –54, –62, –71, –79, –99, –119
  - Indirect [theoretical] or statistical methods 4F–89
  - Kites and gliders, 4F–38
  - Pilot reports, 4F–23
  - Photographic methods, 4F–12, –15, –32
  - Acoustical methods, 4F–10, –16, –32, –52, –53, –69, –92, –103, –117
  - Rockets, 4F–45, –52, –110

Theoretical studies
- Origin of high level winds, 4F–89
- Structure [variation with height], 4F–27, –31, –47, –63, –113
- Relation to general circulation and pressure distribution, 4F–3, –13, –23, –26, –34, –41, –56, –58, –63, –65, –74, –78, –85, –89, –103
- Relation to tropopause and jet stream, 4F–46, –68, –87, –108
- Relation to geostrophic winds, 4F–78, –86, –108
- Relation to gradient winds, 4F–56

Observational data
- Speed, 4F–5 to –9, –12, –14, –15, –17 to –19, –23, –26 to –32, –37, –40, –42, –44, –45, –47, –50, –62, –63, –68, –69, –71, –72, –76, –77, –79 to –81, –85 to –87, –92, –94, –100 to –103, –106, –107, –111 to –113, –115 to –118, –120, –121
- Direction, 4F–1, –6, –8, –9, –12, –14, –15, –17 to –19, –23, –24, –26, –27, –29 to –32, –37, –40, –42, –44, –45, –47, –50, –53, –62 to –66, –68, –69, –72, –76 to –78, –80, –81, –85, –87, –91, –94, –100, –103, –106, –107, –111 to –113, –115 to –117, –123

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Radio propagation, 4F–48
Radio fading, 4F–51
Acoustical propagation, 4F–13, –90, –117

GEOGRAPHICAL OUTLINE

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SELECTIVE BIBLIOGRAPHY ON HIGH LEVEL WINDS (above 100 mb)

1907

4F–1 551.557:523.51

Trowbridge, C. C., **On atmospheric currents at very great altitudes.** *Monthly Weather Review*, 35:390–397, Sept. 1907. 5 tables, 7 figs., 5 refs. **DWB**—Author reviews observational data on drifting of luminous meteor trains and tabulates results. Results summarized by direction of drift. Individual drifts shown in diagrammatic form. Plea is made for systematic observation. *Subject Headings:* **1. Upper air winds 2. Meteor trails.**—*G.J.E.*

4F–2 551.557:523.5

Growbridge, C. C., **Physical nature of meteor trains.** *Astrophysical Journal*, Chic., 26(2):95–16, Sept. **1907.** 9 figs., 4 tables. **DWB**—Brief comments (p. 113–114) on observed drift of about 0 meteor trains at heights below 50 mi. *Subject Headings:* **1. Meteor trails 2. Ionospheric drift.**—*M.P.K.*

1918

4F–3 551.557.2

van Bemmelen, W., **The atmospheric circulation above Australasia according to the pilot alloon-observations made at Batavia.** *Akademie van Wetenschappen te Amsterdam, Proceedings f the Section of Sciences*, 20(9/10):1313–1327, **1918.** 3 tables. **DLC**—Analysis of upper wind bservations from pilot balloon ascents, 1909–1917. Table shows direction and velocity of wind r each month for heights up to 24 km, values being derived from isopleth diagrams of the east-west nd north-south components. Values for principal air currents shown in the different colors. Their ertical movements throughout the year are clearly seen. The antitrade wind is observed blowing hroughout the year, descending to 4 km in winter but not being found under 13 km in summer. *ubject Headings:* **1. Atmospheric circulation 2. Upper air winds 3. Antitrade winds 4. Batavia.** *-G.J.E.*

1920

4F–4 551.557

Dobson, G. M. B., **Winds and temperature gradients in the stratosphere.** *Royal Meteorological ociety, Quarterly Journal*, 46(193):54–62, Jan. **1920.** 6 figs., refs. **DWB**—Seventy cases where balloons-sondes" were followed by theodolites into the stratosphere and which gave satisfactory tem-erature and pressure records studied in detail. Diagrams drawn for each selected ascent and from hese composite diagrams were drawn. Author concludes that velocity within the troposphere creases at a rate which would occur with a constant pressure gradient, but decreases rapidly on ntering stratosphere, and that the direction remains constant from 2 km above the ground to a eight of several km above the tropopause. *Subject Headings:* **1. Temperature of the stratosphere Stratospheric winds.**—*G.J.E.*

1921

4F–5 523.5:551.510.535:551.557

Kahlke, S., **Meteorschweife und hochatmosphärische Windströmungen.** [Meteor trails and ind currents in the high atmosphere.] *Annalen der Hydrographie und Maritimen Meteorologie*, 9(9):294–299, Sept. **1921. DWB**—Author discusses meteor trails in Northern Hemisphere. Day-me and night-time observations of meteor dust listed separately and direction of drift given for ch. Earliest observation quoted is for 1741. *Subject Headings:* **1. Meteor trails 2. Ionospheric inds.**—*G.J.E.*

1926

4F–6 551.593.653:551.557:551.510.535

Malzev, V., **Luminous night clouds.** *Nature*, London, 118(2957):14–15, July 3, **1926.** 2 hotos. **DWB**—Brief descriptive and historical comments include mention of photographic ob-rvations showing cloud movement of velocity 230 m/sec (over 400 mph) to the SSW at about 82 n. *Subject Headings:* **1. Noctilucent clouds 2. Ionospheric winds.**—*M.P.K.*

1928

4F–7 551.510.53:551.557(43)

Zistler, Peregrin, **Die Windverhältnisse in der Stratosphäre über München.** [Wind conditions the stratosphere above Munich.] *Beiträge zur Physik der freien Atmosphäre*, 14:65–74, **1928.** tables, 2 figs., 2 refs. **DWB**—Results of registering balloon ascents, 1906–1914 and 1922–27, 50 which reached a height of at least 11 km, analyzed. Mean horizontal wind speed shows maximum 17.71 m.p.s. at 10 km. Percentage wind directions given at 1 km intervals to 15 km. Examples ven of wind and temperature distribution for specified weather types. *Subject Headings:* **1. Upper r wind frequencies 2. Stratospheric winds 3. Munich, Germany.**—*G.J.E.*

1932

4F–8 551.506.7(261):551.557

Geiger, Rudolf und Wagner, F., **Höhenwinde vor der westafrikanischen Küste im Herbst. gebnisse der 13. Forschungsfahrt der Deutschen Seewarte erweitert durch die Bearbeitung der öhenwindbeobachtungen von deutschen Handelsschiffen.** [Upper winds along the west African ast in Autumn. Results of the 13th scientific expedition of the Deutsche Seewarte, expanded by

means of upper wind observations taken by German merchant ships.] *Aus dem Archiv der Deutschen Seewarte*, Hamburg, 51(2), **1932.** 63 p.+4 charts, 4 tables, 12 figs. **DWB**—Wind distribution along the route which extended south as far as Freetown analyzed and discussed by sections. Frequencies of wind direction and mean wind speed given and extended in some areas to 18 km. *Subject Headings:* **1. Upper air wind data 2. Upper air wind frequencies 3. West Africa.**—*G.J.E.*

1933

4F–9 551.557

*Heywood, G. S. P., **The upper winds of Hong Kong, from observations made with pilot balloons 1921–1932.** Hong Kong, Royal Observatory, **1933.** 13 p. 9 plates. **GB-MO**—Results of 1382 pilot balloon flights given in two tables and nine plates. Monthly values given of resultant directions and velocities, and of percentage frequencies from different directions. Data up to 30,000 ft where available. *Subject Headings:* **1. Upper air wind data 2. Hong Kong.**—*G.J.E.*

1934

4F–10 551.596.1:551.557

Regula, Herbert, **Seismische Untersuchungen des Geophysikalischen Instituts in Göttingen. XVI. Schallausbreitung in der Atmosphäre.** [Seismic researches at the Geophysical Institute, Göttingen. XVI. Sound propagation in the atmosphere.] *Zeitschrift für Geophysik*, 10(3/4):167–185, **1934. DLC**—Author discusses reception of sound waves as means of measurement of high level winds. Sound-wave registrations (775), 1923–1929, available for analysis. Theories of anomalous propagation discussed and observations made of the Oldebrock explosion in 1932 dealt with in detail. *Subject Headings:* **1. Acoustical propagation 2. Upper air wind measurement.**—*G.J.E.*

1935

4F–11 551.557:523.51

Olivier, Charles P., **Conditions in the upper atmosphere as indicated by a study of meteor-trains.** *American Geophysical Union, Transactions*, 16:32–34, **1935. DWB**—Concludes that meteor trains prove that wind velocities of between 100 and 300 km/hr are usual feature of the stratum in which meteor trains appear at night, and that there is good evidence of vertical component. *Subject Headings:* **1. Stratospheric winds 2. Meteor trails.**—*G.J.E.*

4F–12 551.593.653:551.557

Störmer, Carl, **Measurements of luminous night clouds in Norway, 1933 and 1934.** *Astrophysica Norvegica*, Oslo, 1(3):87–114, **1935.** 3 figs.+17 plates. **DSI**—Simultaneous photographs of luminous clouds obtained by three aurora stations. Seven pairs of photographs yielded 41 heights with mean height of 82.2 km., confirming earlier results of author and of JESSE. Velocity of clouds was 81 to 83 m/sec, from east to west. *Subject Headings:* **1. Noctilucent clouds 2. Stratospheric winds.**—*G.J.E.*

4F–13 551.557:551.596.1

Whipple, Francis J. W., **The propagation of sound to great distances.** *Royal Meteorological Society, Quarterly Journal*, 61(261):285–308, July, **1935.** 16 figs. **DLC**—As a result of work on propagation of sound, author discusses monsoon winds in upper atmosphere. Striking alternation in summer and winter reception conditions suggested such winds. Comparison made of seasonal variation in temperature, pressure and wind at 20 km over England and Lapland. *Subject Headings:* **1. Acoustical propagation 2. Upper air winds 3. England 4. Lapland.**—*G.J.E.*

4F–14 551.593.653:551.557:551.510.535

Wörner, Heinrich, **Beobachtung leuchtender Nachtwolken.** [Observation of notilucent clouds.] *Meteorologische Zeitschrift*, 52:379, **1935.** 3 refs. **DWB**—Two noctilucent clouds were observed by theodolite in 1935 over Königsberg. Estimated to be at 70 km moving from NE at 70 m/sec. *Subject Headings:* **1. Noctilucent clouds 2. Ionospheric winds 3. Kaliningrad, U.S.S.R.**—*R. Quiros.*

1936

4F–15 551.507.321.2:551.506.7:551.557

Brombacher, W. G., **Wind direction and velocity derived from the travel of the balloon "Explorer III."** *National Geographic Society, Washington, Contributed Technical Papers, Stratosphere Series*, No. 2:144–146, **1936.** 2 figs. **DLC**—Vertical camera photographs enabled the path of the balloon to be determined and from this, wind direction and speed at levels up to 70,000′. *Subject Headings:* **1. Balloon research 2. Upper air winds 3. Stratospheric winds.**—*G.J.E.*

4F–16 551.510.53

†Haurwitz, Bernhard, **The physical state of the upper atmosphere.** *Royal Astronomical Society of Canada, Toronto, Journal,* 30(8–10):315–330; 349–366; 397–415, Oct.–Dec. **1936. DLC**—Reprinted as separate. University of Toronto Press, **1937.** 96 p. 30 figs., 11 tables, 121 refs. Also with supplementary material by Royal Astronomical Society of Canada, Oct. **1941. GB-MO**—Survey of knowledge first presented as series of public lectures. Results of upper wind observations from mother-of-pearl and noctilucent clouds, meteors, and the anomalous propagation of sound briefly dealt with in their respective sections. Good selective bibliography given for each section. *Subject Headings:* **1. Structure of the stratosphere 2. Stratospheric winds.**—*G.J.E.*

1937

4F–17 551.557(661)

Buroleau, M., **Note sur les courants aériens à Dakar.** [Note on the upper air currents over Dakar.] *Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française, Publications, Ser. B,* No. 3:35–40, **1937.** 2 pl., table. **GB-MO**—Morning and afternoon observations, 1933, analyzed. The five main currents: trade, counter-trade, monsoon, harmattan and upper westerlies are discussed. Last-named were observed between October and May with one ascent showing them to extend up to 18.15 km. Maximum speeds of about 120 km/hr observed at about 11 km. *Subject Headings:* **1. Upper air winds 2. Dakar, French West Africa.**—*G.J.E.*

1939

4F–18 551.506.5:551.557(988)

Carmichael, H. and Dymond, E. G., **Upper air investigations in North-west Greenland.** *Royal Society of London, Proceedings, Ser. A,* 171(946):345–359, June **1939.** 8 figs., 1 table, 10 refs. **DWB**—Limited number of observations of upper wind were made incidentally to cosmic radiation investigations conducted during the Wordie expedition to N.W. Greenland, summer 1937. Frequency table gives number of wind directions observed at each level to 30 km. Figures give wind speed and directions for 23 ascents. Ascents showed very still air in stratosphere with a marked wind speed maximum at about 9 km in troposphere. *Subject Headings:* **1. Upper air wind observations 2. Expeditions 3. Northwest Greenland.**—*G.J.E.*

4F–19 551.506.7(567,782)

*Ockenden, C. V., **High altitude pilot balloon ascents at Habbaniya, Iraq.** *Royal Meteorological Society, Quarterly Journal,* 65(282):551–553, Oct. **1939.** fig. **DWB**—Eleven ascents made during International Balloon Week, April 17–22, 1939 reached heights between 73,000 and 105,000 ft. Results tabulated and velocity-height diagram given comparing results with values published for Nebraska. Westerly current has a maximum speed at about 50,000 ft which varied from day to day from about 45 m.p.h. to as much as 140 m.p.h. *Subject Headings:* **1. Upper air wind data 2. Iraq 3. Nebraska.**—*G.J.E.*

1940

4F–20 551.510.53:551.557

†Ekhart, E., **Zur Kenntnis der Windverhältnisse in der oberen Stratosphäre.** [On knowledge of wind conditions in the upper stratosphere.] Germany, Reichsamt für Wetterdienst, **1940.** 50 p. 13 figs., 14 tables, bibliog. p. 41–43. **DWB**—Good review of the various techniques of upper air wind observations, their reliability and limitations. Examples of data obtained by each method and references to outstanding literature given. *Subject Headings:* **1. Upper air wind measurement 2. Stratospheric winds.**—*M.P.K.*

4F–21 551.510.53:551.557

Eredia, Filippo, **I fenomeni atmosferici della stratosfera.** [Atmospheric phenomena in the stratosphere.] *Rivista Aeronautica,* Rome, 16(2–3):229–240; 411–428, Feb.–March, **1940.** 11 figs. **DLC**—Surveys results observed by PICCARD and M. P. W. TOMLINSON, by balloon soundings and by observations of noctilucent clouds. *Subject Heading:* **1. Stratospheric winds.**—*G.J.E.*

1942

4F–22 551.510.5(02)

Barbier, Daniel and Chalonge, Daniel, **De la stratosphère à l'ionosphère.** [From the stratosphere to the ionosphere.] Paris, Presses Universitaires de France, **1942.** 154 p. 38 figs., 2 tables, 8 plates, 7 refs. **DWB**—A pocket-size text reviewing knowledge to date (1942) of composition, structure, electrical properties, movements, controls and effects of the upper atmosphere. Sections on ozone, the aurora, ionosphere, methods of sounding and cosmic influences are fairly technical but

easily understood by the layman. Some good photographs and schematic diagrams as well as illustrative tables are included. (*Same item as* 3.1–69, Jan. 1952, *MAB.*) *Subject Headings:* **1. Stratosphere 2. Ionosphere 3. Upper air winds 4. Textbooks.**—*M.R.*

4F–23 551.515:551.557

Horrocks, H., **Winds at high levels relative to the fronts and occlusions of typical depressions.** London, Meteorological Office, **1942.** 26 p. 43 figs. M.O.M. 431. **GB-MO**—Diagrams show radio pilot wind observations for heights up to 80,000 ft about depressions with large warm sectors, occlusions and secondary depressions traversing Great Britain. Some 3000 ascents were used in constructing the diagrams. *Subject Headings:* **1. Upper air winds 2. Depressions 3. Great Britain.**—*G.J.E.*

4F–24 551.587

***Normals of upper air data up to the end of 1935.** *India. Meteorological Dept., Upper Air Data*, 12, Pt. B, **1942.** 206 p. 11 plates.—Mean monthly tephigrams based on data from Poona-Hyderabad, Agra and Madras, include N and E components of winds at the various pressure levels up to 50 mb. The scale however does not permit any accurate extraction. *Subject Headings:* **1. Upper air climatology 2. Upper air wind data 3. India.**—*G.J.E.*

4F–25 551.557:523.5

*Olivier, Charles P., **Long enduring meteor trains.** *American Philosophical Society, Proceedings*, 85(2):93–131, Jan. **1942.** 3 tables. **2nd Paper,** *ibid.*, 91(4):315–327, Oct. **1947.** 11 figs., 2 tables. **DWB**—Paper I includes lengthy tables giving all salient facts on 1336 trains which persisted long enough to exhibit drift. Table II contains further specific data on heights and drifts for 583 trains and table III gives monthly totals for all years in order of magnitude. Drift velocities from 121 to over 200 km/hr at heights 30–102 km mentioned. Paper II is a revision and enlargement containing data for 156 more recent trains. *Subject Headings:* **1. Meteor trails 2. Ionospheric drift.**—*M.P.K.*

1943

4F–26 551.5(02) 551.557

Hann, Julius von and Süring, Reinhard J., **Lehrbuch der Meteorologie.** [Textbook of meteorology.] Leipzig, Willibald Keller, **1943.** 5th ed. Lieferung 6. p. 639–641. figs., tables. **DLC**—Brief discussion of upper air winds over the equatorial region and trade winds. Some data up as high as 24 km included. *Subject Headings:* **1. Upper air winds 2. Equatorial region.**—*M.P.K.*

4F–27 551.557(43)

Lunz, P., **Mittlere Höhenwinde aus Registrierballonflugbahnen Lindenberg und München 1906–1938.** [Mean upper wind from registering balloon flights at Lindenberg and Munich, 1906–1938.] *Meteorologische Zeitschrift*, 60:132–136, **1943.** 9 figs., 2 tables. **DWB**—Upper winds compared for summer and winter. Tables give values at 1 km intervals between 9 km and 28 km. Variations with height are briefly discussed. *Subject Headings:* **1. Upper air winds 2. Germany.**—*G.J.E.*

1944

4F–28 523.5:551.510.535:551.557

Fedynskiĭ, V. V., **Rezul'taty nabliudeniĭ meteornykh sledov v Tadshikistane (1934–1938).** [Results of observations of meteor trains in Tadzhikistan (1934–1938).] *Astronomicheskiĭ Zhurnal*, Moscow, 21(6):291–306, **1944.** 2 figs., 57 refs., tables, eqs. English abstract, p. 305–306. **DLC**—Forty-one night meteor trains observed systematically. A number show drifts of order of 1000 km/hr. Average velocity was 391 km/hr. *Subject Headings:* **1. Meteor trails 2. Ionospheric winds 3. Tadzhikistan, U.S.S.R.**—*G.J.E.*

1945

4F–29 551.582(52)

*Great Britain. Meteorological Office, **Meteorological report on the main islands of Japan.** *Great Britain. Meteorological Office, Aviation Meteorological Report*, No. 27, **1945.** 54 p. 14 plates, 7 appends. M.O.M. 365/27. **GB-MO**—Principally for the synoptic meteorologist. Appendices mainly in form of tables of various meteorological elements. Appendix V gives wind in knots derived from mean isobars at various heights from 3 km to 19 km above Hokkaido and Kyushu, values being derived from the U. S. Weather Bureau "Normal Weather Maps, Northern Hemisphere, upper level." *Subject Headings:* **1. Aeronautical meteorology 2. Upper air wind data 3. Japan.**—*G.J.E.*

1946

4F–30 551.577.2(266)

Alpert, Leo, **The intertropical convergence zone of the eastern Pacific region. (III) Pilot balloon observations.** *American Meteorological Society, Bulletin*, 27(2):62–66, Feb. **1946. DWB**—Pt. III gives monthly wind roses for Seymour Island (Galapagos Archipelago) from surface to 22,000 ft calculated from single theodolite balloon observations made between October 1942 and September 1943. Tables given for frequencies of wind directions and speeds up to 75,000 ft, and for average speeds for each month up to 22,000 ft. Data shows agreement with observations made on Cruise VII of the "Carnegie" in November 1928. *Subject Headings:* **1. Upper air wind roses 2. Galapagos Islands 3. Eastern Pacific Ocean.**—*G.J.E.*

4F–31 551.510.53

Gutenberg, B., **Physical properties of the atmosphere up to 100 km.** *Journal of Meteorology*, (2):27–30, June, **1946.** 5 figs. 26 refs. **DWB**—Discusses temperature, pressure, density and other physical properties in stratosphere. Diagram shows variation with height of approximate characteristic values of wind speed and direction, and velocity of sound up to 80 kms. *Subject Headings:* **1. Stratosphere 2. Upper air wind data.**—*G.J.E.*

4F–32 551.513:551.557

Hoffmeister, C., **Die Strömungen der Atmosphäre in 120 km. Höhe.** [Atmospheric currents at a height of 120 km.] *Zeitschrift für Meteorologie*, 1(2/3):33–41, Nov.–Dec., **1946.** 8 figs., 2 tables, 5 refs. **DWB**—Observations of meteor trails were partly visual, partly photographic. Height determinations from pairs of photographs showed optimum density for trails to be about 120 km and this height was assumed throughout. Results of observations of velocity and direction shown graphically. There is ample photographic evidence of strong turbulence at this level. *Subject Headings:* **1. Meteor trails 2. Upper air winds.**—*G.J.E.*

4F–33 551.557

Johnson, N. K., **Wind measurements at 30 Km.** *Nature*, London, 157:24, **1946. DLC**—A note summarizing work of R. J. MURGATROYD on the drift of smoke puffs from shell bursts. *Subject Heading:* **1. Upper air wind observations.**—*G.J.E.*

1947

4F–34 551.513

Flohn, Hermann, **Zur Rolle des Oberpassats in der allegemeinen Zirkulation.** [On the role of the upper trades in the general circulation.] *Meteorologische Rundschau*, 1(1–2):23–24, July–Aug. **1947.** table, bibliog. **DWB**—A brief note on the winds at 10, 14 and 18 km in low latitudes, with evidence of flow contrary to that of the trades. (*Same item as* 3–52, March 1950, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Trade winds 3. Upper air winds.**—*M.R.*

4F–35 551.510.535:016

†Manning, Laurence A. (*comp.*), **A survey of the literature of the ionosphere.** Stanford University. Dept. of Engineering, Contract W33-038 ac-14737, High Altitude Radio Frequency Propagation, Final Report No. 1-Fl, Aug. 30, **1947.** 278 p. figs., refs. **DWB**—An extensive annotated bibliography (about 1000 items) including about 40 references classified under the heading, "Weather, winds in ionosphere, tropospheric reflections" which can be located by use of the cross index, p. 200–201. *Subject Headings:* **1. Ionospheric winds 2. Bibliographies 3. Radio wave propagation. I. Stanford University. Dept. of Engineering II. Contract W33-038 ac-14737.**—*M.P.K.*

1948

4F–36 551.510.535

Beynon, W. J. G., **Evidence of horizontal motion in region F_2 ionization.** *Nature*, London, 162(4127):886, Dec. 4, **1948.** 2 refs. **DWB**—During winters 1942 and 1943, relative field-strength measurements were made at Slough (England) on signals from the German short-wave sender Zeesen. In addition to regular sunrise ionospheric changes of large magnitudes in the F_2 layer, small irregularities were noted that suggest a rapid east-west motion of or within the F_2 region with an average velocity of 430 km./hr. *Subject Headings:* **1. Ionospheric drift 2. F2 layer 3. Slough, England.**—*G.J.E.*

4F–37 551.510.535

Ferrell, O. P., **Upper-atmosphere circulation as indicated by drifting and dissipation of intense sporadic-E clouds.** *Institute of Radio Engineers, New York, Proceedings*, 36:879–880, July **1948.**

7 figs., 11 refs. **DWB**—Co-operative research program was initiated by author in 1947 to study effects of sporadic-E reflections in the radio amateur band (50–56 Mc.). Observations of two sporadic-E clouds show drifts in one case due west with a speed of 130 m/sec and in the second a northwestward drift of 40 m/sec. *Subject Headings:* **1. Ionospheric drift 2. Sporadic-E clouds.**—*G.J.E.*

4F–38 551.507.351:551.510.53

Jarland, R. (*Chief Engr., Arsenal de L'Aéronautique, France*), **The stratospheric glider and scientific research.** Locust Valley, N. Y., Aerophysics Institute, Inc., **1948.** 12 p. diagrs., graphs. Trans. of his article in French, from *Espace*, July **1947. DWB**—Use of glider in France and Germany for military and civilian purposes, advantages of glider over power planes or balloons for research, records attained (12 km by Klockner in 1942) at a time when a lenticular cloud was at 14 km, possibility of reaching 20 km during föhn conditions over Alps, and specific problems of research which could be solved, outlined briefly. Study of vertical motions, standing waves, atmospheric electricity, cloud physics, visibility in clouds, condensation trails, cosmic radiation, aerodynamics, etc. without hindrance of motor or metal are mentioned and some results obtained by gliders illustrated graphically. The stratosphere glider is described and detailed specifications given for a pressurized and heated plane which could carry the necessary instruments from 17 km down. Advantages of electrical and chemical heating are compared. (*Same item as* 3.9-46, Sept. 1952, *MAB.*) *Subject Headings:* **1. Gliders 2. Upper atmosphere research. I. Aerophysics Institute, Inc.**—*M.R.*

4F–39 551.501.7:551.508.85

Kirkman, Robert A. and LeBedda, John M., **Meteorological radio direction finding for measurement of upper air winds.** *Journal of Meteorology*, 5(1):28–37, Feb. **1948.** 14 figs., 4 refs., eq. **DWB**—Radio and radar equipment for tracking meteorological balloons was developed by the U. S. Signal Corps at their Engineering Laboratories at Fort Monmouth, N. J. Various types of equipment (SCR-258, SCR-525, SCR-658 and AN/CRD-1), the Caltech aural direction-finder, various types of antennas and mobile ground sets are described and illustrated, along with charts showing performance and accuracy ranges. Balloons may be tracked to over 100,000 ft height with angular errors of the order of .05 to .15 degrees. (*Same item as* 5–14, May 1950, *MAB.*) *Subject Headings:* **1. Radar equipment 2. Upper air wind measurement 3. Radar echoes.**—*M.R.*

1949

4F–40 551.506.5:551.557(99)

*Court, Arnold, **Meteorological data for Little America III. Tabular and graphical results of observations made at the West Base of the United States Antarctic Service Expedition of 1939–41.** *Monthly Weather Review, Supplement* No. 48, **1949.** 150+p. plate, 9 figs., 31 tables. **DWB**—Pt. II (of 8) gives individual ascents and summaries of pilot balloon observations. Monthly wind roses included for varying levels to 18 km. Summaries give resultant and resultant component winds for each month for varying levels generally exceeding 5 km. *Subject Headings:* **1. Antarctic expeditions 2. Upper air wind data 3. U. S. Antarctic Service Expedition, 1939–41 4. Little America III.**—*G.J.E.*

4F–41 551.513:551.557

Hubert, L. F., **High tropospheric westerlies of the equatorial West Pacific Ocean.** *Journal of Meteorology*, 6(3):216–224, June **1949.** 17 figs., 15 refs. **DWB**—Investigation of 20,000, 30,000, 40,000 and 50,000 ft maps showed that well-developed vortices consistently existed above the trade winds and that 40,000 ft was the level of maximum development of these vortices. Despite this prevalence of vortices, a broad current analogous to the westerlies of higher latitudes was also to be seen. Charts at 40,000 feet for the period 22–27 Sept. 1945 examined and the westerlies seen subject to aperiodic fluctuations. They are considered part of the mechanism for exchange of air and vorticity across the equator. *Subject Headings:* **1. Upper air winds 2. Atmospheric circulation.**—*G.J.E.*

4F–42 551.506.7:551.510.535:551.557

Mitra, S. N., **A radio method of measuring winds in the ionosphere.** *Institution of Electrical Engineers, London, Proceedings, Pt. III*, 96:441–446, **1949.** 10 figs., 14 refs. **DLC**—A pulse transmitter on 4 Mc/s was used in conjunction with three receivers set at the corners of a right-angled triangle separated by about 100 metres. A simultaneous record was made of the fading of a single radio pulse. The result of 82 determinations of wind are shown in histograms. The most frequent velocity found was about 50 m/sec toward the north west. A semi-diurnal period seems probable. (*Same item as* 2H-143, Aug. 1951, *MAB.*) *Subject Headings:* **1. Ionospheric winds 2. Radio observation.**—*G.J.E.*

4F–43 551.510.535

Munro, G. H., **Short-period variations in the ionosphere.** *Nature*, London, 163(4151):812–814, May 21, **1949.** 2 figs. **DWB**—Results presented of an investigation into horizontal movements in the F region. Ionization changes observed which appeared to progress horizontally. Established that local fluctuations in ionization in F region show vertical progression downwards as well as horizontal progression. Three point observations at Sydney give horizontal velocity of 7 km/min. Reasons for difference discussed. Question of whether effects observed are due to a pressure wave or to an ionospheric drift not argued. *Subject Headings:* **1. Ionospheric variations 2. Canberra, Australia 3. Sydney, Australia.**—*G.J.E.*

4F–44 551.506.7:551.557

Murgatroyd, R. J. and Clews, C. J. B., **Wind at 100,000 ft. over south-east England; observations and a discussion of the monsoon theory of wind at great heights.** London, H. M. Stationery Office, **1949.** 14 p. 5 figs., 3 tables, 5 refs. *Great Britain. Meteorological Office, Geophysical Memoirs*, No. 83. M.O. 499c. **DWB**—Winds at 100,000 ft observed by drift of 35 shell bursts in 1944–1945 were mainly strong northwest-southwest in winter (up to 130 km) and moderate northeast-southeast in summer. Temperatures up to 60,000 ft. at Larkhill and Lerwick gave thermal winds agreeing with these observations. (*Same item as* 3–91, March 1950, *MAB.*) *Subject Headings:* **1. Upper air temperatures 2. Upper air winds 3. England.**—*C.E.P.B.*

4F–45 551.510.53

Regula, Walter, **Temperaturen und Winde in der oberen Stratosphäre.** [Temperatures and winds in the upper stratosphere.] *Meteorologische Rundschau*, 2(9/10):267–270, Sept./Oct. **1949.** fig., table. **DWB**—From the White Sands V-2 ascent and luminous night clouds at 82 km over Norway on June 30, 1934, author constructs chart of 9.1×10^{-3} mb level over S. Norway. Clouds show wave formation indicating strong inversion at 82 km; from this, various assumptions, and observations of luminous clouds and meteor trails up to 120 km he constructs table for S. Norway.

Height, km.	22	47	82	109	123
Pressure, mb.	41	0.92	9.1×10^{-3}	1×10^{-4}	1.8×10^{-5}
Temperature °A.	230	320	180	265	
Wind, m/s	E0	E35	E80	E0	W42

Above 82 km mean wind is 122 m/s from W., showing a marked reversal of horizontal temperature gradient. (*Same item as* 4–41, April 1950, *MAB.*) *Subject Headings:* **1. Upper air temperatures 2. Upper air winds 3. Upper stratosphere.**—*C.E.P.B.*

4F–46 551.557 551.524.7

Scrase, Frederick J., **Wind and temperature measurements up to 30 km.** *Nature*, London, 164(4170):572, Oct. 1, **1949.** fig., 6 refs. **DLC**—Brief discussion of results of seven radio and radar soundings released in the south and east of England which reached 30 km. Double tropopause and easterlies from 20–30 km are mentioned. A more detailed report appears in *Meteorological Magazine*, Oct. 1949. (*Same item as* 2.4–118, April 1951, *MAB.*) *Subject Headings:* **1. Upper air winds 2. Upper air temperatures 3. England.**—*M.R.*

4F–47 551.510.53

Sheppard, Percival A., **The exploration of the upper atmosphere.** *Science Progress*, London, 37:488–503, **1949.** 6 figs., table, 37 refs. **DWB**—Various methods and techniques employed outlined. Section devoted to winds of the upper atmosphere. Figure gives tentative curves of variation of wind speed with height in middle latitudes during summer and winter, to a height of 200/300 km. *Subject Headings:* **1. Upper air research 2. Ionospheric winds 3. Stratospheric winds.**—*G.J.E.*

1950

4F–48 551.510.535:551.594.7

Booker, H. G., Ratcliffe, J. A. and Shinn, D. H., **Diffraction from an irregular screen with applications to ionospheric problems.** *Royal Society of London, Philosophical Transactions, Ser. A*, 242(856):579–609, Sept. **1950.** 6 figs., 17 refs., eqs. **DWB**—Investigation made first of the distribution of wave-field over the ground, due to a wave which has been diffractively reflected from an irregular ionosphere of constant form. Analysis then extended to deal with an irregular ionosphere whose structure varies with time. Resulting fading at the ground discussed. Temporal auto-correlation function of the amplitude of the irregularly fading signal related to velocity of the ionospheric diffracting centers. *Subject Headings:* **1. Ionospheric variations 2. Radio fading.**—*G.J.E.*

4F–49 551.510.53

Boutet, R. A., **La haute atmosphère.** [The high atmosphere.] *France. Office National d'Études et de Recherches Aéronautiques, Publication,* No. 38, **1950.** 121 p. 51 figs., tables, bibliog. p. 117–121.—Chapter on winds briefly summarizes observations made of wind in upper troposphere and stratosphere, vertical motion and turbulence. *Subject Headings:* **1. Stratospheric winds 2. Upper air winds 3. Atmospheric turbulence.**—*G.J.E.*

4F–50 551.587(749)

Brasefield, C. J., **Winds and temperatures in the lower stratosphere.** *Journal of Meteorology,* 7(1):66–69, Feb. **1950.** 6 figs., 9 refs. **DWB, DLC, MH-BH**—Results of 20 radiosonde flights to above 100,000 ft over New Jersey, 1948–1949, analyzed. Winds strongest (westerly) at ca/40,000 ft but in summer there was evidence of an easterly flow between 60,000 and 120,000 ft, and also of a stratospheric jet stream. No unusually high temperatures found in the stratosphere (−30°C at 120,000 ft being the highest). Equipment, balloons and radiosonde elements described. (*Same item as* 5–100, May 1950, *MAB.*) *Subject Headings:* **1. Radiosondes 2. Upper air temperatures 3. Upper air winds 4. Stratosphere 5. New Jersey.**—*M.R.*

4F–51 551.510.535:551.557:551.594.7

Briggs, B. H., Phillips, G. J. and Shinn, D. H., **The analysis of observations on spaced receivers of the fading of radio signals.** *Physical Society of London, Proceedings, Sec. B,* 63(2):106–121, Feb. **1950.** 8 figs., 5 refs. **DLC**—Authors point out that fading may be due to drift of a diffraction pattern past a receiver, or to irregular variations in the pattern or both operating simultaneously. Steady velocity of the drift and rate at which the pattern alters as it moves may be calculated by taking observations at three points at the corners of a right-angled triangle. *Subject Headings:* **1. Radio fading 2. Ionospheric winds.**—*G.J.E.*

4F–52 551.510.53:551.557

†*California. University at Los Angeles. Institute of Geophysics, **Survey of data and theoretical analysis of the upper atmosphere.** Contract Cwb 7904, Final Report, June **1950.** Pt. I–IV. 4 pieces. figs., plates, tables, refs., eqs. **DLC, DWB**—Report divided into four parts. First gives methods and results of upper atmosphere research. Stratosphere winds observed at varying heights by gun shells, rockets, and noctilucent clouds and derived from propagation of sound and radio waves and meteors. Pt. II on turbulence in the upper stratosphere gives evidence of convection currents between 50 and 80 km (*same item as* 3K–206, Nov. 1952, *MAB*). Pt. III proposes a tentative model of stratospheric circulation up to 120 km. Pt. IV discusses the atmosphere above 100 km. *Subject Headings:* **1. Stratospheric research 2. Stratospheric winds. I. U. S. Weather Bureau II. Contract Cwb-7904 III. Kellogg, William W. IV. Schilling, G. F.**—*G.J.E.*

4F–53 551.596.1:551.557:551.524.7

Crary, A. P., **Investigation of stratosphere winds and temperatures from acoustical propagation studies.** *U. S. Air Force. Cambridge Research Laboratories, Geophysical Research Papers,* No. 5, June **1950.** 32 p. 21 figs., 7 tables, 12 refs. **MH-BH**—Knowledge of stratospheric winds and temperatures over Canal Zone, Bermuda, Alaska, New Mexico and East coast of U. S. obtained from acoustical investigation of velocities of compressional waves at 30–60 km. Easterly winds found in summer for all latitudes, with minimum values in Alaska; high westerlies found in Alaska in winter. Diurnal effects shown negligible. (For fuller abstract *see* J–108, Oct. 1950, *MAB.*) *Subject Headings:* **1. Acoustical soundings 2. Anomalous sound propagation 3. Upper air winds 4. Upper air temperatures.**—*M.P.K.*

4F–54 523.5:551.510.535:551.557

Ellyett, C. D., **The influence of high altitude winds on meteor trail ionization.** *Philosophical Magazine,* London, Ser. 7, 41(318):694–700, July **1950.** 2 tables, 3 figs., 16 refs. **DWB**—Author examines available evidence to show how winds at 80–120 km can account for complex disturbances that appear in meteor trails as shown by radio wave reflections. By comparing characteristics of fading of radio waves from ionosphere with fluctuations of radio echoes from meteor trails, it is concluded that some of the ionospheric fading is due to meteor ionization at E region heights. *Subject Headings:* **1. Meteor trails 2. Ionospheric winds 3. Radio fading.**—*G.J.E.*

4F–55 551.513:551.506.5:551.557

Flohn, Hermann, **Grundzüge der allgemeinen atmosphärischen Zirkulation auf der Südhalbkugel.** [Characteristics of the general circulation over the Southern Hemisphere.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A,* 2(1):17–64, **1950.** 12 figs., 22 tables, 65 refs. German, English and French summaries p. 17–18. **DWB**—Radiosonde data from the German

Antarctic Expedition in 1938/39 compared with all other mean values available. By computing heights of standard isobaric surfaces from distribution of virtual temperature, a meridional cross section is derived showing the zonal component of upper winds in summer, to a height of 30 km. Approximate mean values also computed for summer. Seasonal variations in circulation of upper stratosphere discussed. Resultant winds at 5 km given for summer and winter for 10 stations and 3 positions of the "Meteor." Mean zonal components given for levels up to 41 mb for summer and winter in both hemispheres. Mean zonal components at 5 km level for 10 degree zones between latitudes 30° and 70° also tabulated. (*Same item as* 6-39, June 1950, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Upper air winds 3. Stratospheric winds 4. Antarctic expeditions.**—*G.J.E.*

4F–56 551.513.2

Flohn, Hermann, **Die planetarische Zirkulation der Atmosphäre bis 30 km. Höhe.** [The planetary circulation of the atmosphere up to a height of 30 km.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte,* No. 12:156–161, **1950.** 4 figs., 36 refs. **MH-BH**—Sections from North to South Pole are constructed to show mean heights of 8 isobaric surfaces (1000–12.5 mb) in winter and summer. From these, meridional sections of E–W components up to 30 km are obtained. Members of circulation are defined as- Trade, Counter-trade, Upper trade, Extratropical W-wind zone, polar E-wind caps. In the Trade and Upper trade are occasional local W-winds. All members of the circulation are gradient winds. Differences in circulation of Northern and Southern Hemispheres are attributed to land and sea distribution. Fig. 4 compares apparent angular velocity of earth's clouds with surface of Jupiter and sun. (*Same item as* 10–60, Oct. 1950, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Upper air winds.**—*C.E.P.B.*

4F–57 551.510.535

Gerson, Nathaniel C., **Large-scale sporadic movements of the E-layer of the ionosphere.** *Nature,* London, 166(4216):316–317, Aug. 19, **1950.** fig. **DWB**—Preliminary results given of work on sporadic movements of E-layer, undertaken by radio amateurs (operating on 50 Mc/s) situated in various parts of North America. Observed direction of movements and speeds of 4 reflecting regions suggest an anticyclonic circulation. *Subject Headings:* **1. Ionospheric drift 2. Sporadic-E layer.**—*G.J.E.*

4F–58 551.557:551.513

Goldie, A. H. R., **The average planetary circulation in vertical meridian planes.** (In: **Royal Meteorological Society, Centenary Proceedings, 1950.** p. 175–180. 2 figs.) **MH-BH**—Mean wind circulation up to 45 km represented in terms of resultant E-W motion, vertical motion inferred from differences of density. In each hemisphere there are 2, or (doubtfully) 3, circulations in opposite senses one over the other; this is explained by unequal heating of two atmospheric columns up to 250–370 mb. The lowest circulation is primary, the higher ones secondary. (*Same item as* 2.3–115, March 1951, *MAB.*) *Subject Headings:* **1. Planetary circulation 2. Upper air winds.**—*G.J.E.*

4F–59 551.501.8:551.557

Gormley, P. M., **High weather.** *Aero Digest,* 61(5):30–31, 105–107, Nov. **1950.** 5 figs. **DLC**—Methods of determining winds at very high altitudes discussed and illustrated. Balloons reach 100,000 ft and rockets 250 miles (the latter are useless for determining winds). Observations of noctilucent clouds or of meteor trails give occasional information on winds at certain altitudes, but recent measurements of the movement of sporadic E layer ionic drift have given more consistent results. Radar reflections from drifting meteoric dust clouds give a Döppler effect (interference), arising from winds of high speeds in the stratosphere. Methods used for measurements of ionic or meteoric drift by radar are shown diagrammatically. (*Same item as* 2.4–117, April 1951, *MAB.*) *Subject Headings:* **1. Radar observation 2. Meteoric dust clouds 3. Upper air winds.**—*M.R.*

4F–60 551.501.81:551.557

Greenhow, J. S., **The fluctuation and fading of radio echoes from meteor trails.** *Philosophical Magazine,* London, 41(318):682–693, July **1950.** 10 figs., tables, 8 refs. **DLC**—Fluctuations of periods 0.01 and 0.1 sec were observed on 36 to 72 Mc/s radio wave frequency. Author arrives at the conclusion that the phenomenon is due to wind gradient in the high atmosphere causing a break-up of the trail of meteor ionization. Hence formation of several reflecting regions. *Subject Headings:* **1. Radio echoes 2. Upper air winds 3. Meteor trails.**—*W.N.*

4F–61 551.590.25:551.557

Ionosphere winds charted from meteor echoes. *Electronics,* Albany, N. Y., 23(10):120, 122, **1950.**—Evidence, through utilization of the Döppler effect, for the existence of ionospheric winds of 88–130 km/h. *Subject Headings:* **1. Ionospheric winds 2. Meteor echoes.**—*W.N.*

4F–62 551.510.535:551.557:551.590.25

Manning, Laurence A., Villard, O. G. and Peterson, A. M., **Meteoric echo study of upper atmosphere winds.** *Institute of Radio Engineers, New York, Proceedings,* 38:877–883, **1950.** 11 figs., 12 refs., 11 eqs. **DLC**—Döppler frequency shift given to a continuous-wave reflection from a meteoric ionization column created by the passage of a meteor, used to measure wind drift at 90–110 km. Measurements during summer 1949 show average winds to be horizontal with velocities of about 125 km/hour, mainly from S–SW. (*Same item as* 2H–186, Aug. 1951, *MAB.*) *Subject Headings:* **1. Ionospheric winds 2. Meteor trails 3. Radio echoes.**—*G.J.E.*

4F–63 551.557.2(54)

Venkiteshwaran, S. P., **Winds at 10 kms and above over India and its neighbourhood.** *India. Meteorological Dept., Memoirs,* 28, Part 2:55–120, **1950.** 6 plates, 72 charts, 15 refs. **DWB**—Thorough analysis of all upper wind data for India, 1920–1941, including data for the Persian Gulf, Burma and Port Blair and Car Nicobar. Appendix A gives mean upper wind speeds and directions between 10 and 20 km at 1 km intervals, for each month at about 50 stations. Appendix B gives similar data, where available, for 21 km and above. Charts show mean air movement at every 2 km interval between 10 and 20 km. Variations of wind with height over different regions discussed. Chief feature of the circulation at these levels is the "High" over the South China Sea in winter which moves up to Himalayas by July and Aug. (*Same item as* 2.6–88, June 1951, *MAB.*) *Subject Headings:* **1. Upper air wind data 2. Zonal circulation 3. India.**—*G.J.E.*

4F–64 551.510.535:551.557

Weekes, K., **The measurement of wind velocities in the ionosphere.** *Conference on Ionospheric Physics, Pennsylvania State College, Proceedings,* 2:1Q–2Q, [1950]. Discussion: p. 3Q–4Q. **DWB**—Brief description of work at the Cavendish Laboratory, Cambridge University. Drift velocities were of the order of 70 m/sec and show daily and seasonal changes. The E–W component was found to be more regular than the N–S. It was always westward at night and decreased during daylight hours, becoming eastward during summer. *Subject Heading:* **1. Ionospheric winds.**—*G.J.E.*

1951

4F–65 551.506.7:551.547(931)

Barnett, M. A. F., **Mean circulation at high levels over New Zealand.** *Journal of Meteorology,* 8(3):202, June **1951.** refs., table. **DWB**—Mean heights of 60 mb surface for each month at Auckland and Hokitika tabulated. Data indicate that wind is predominantly easterly in Dec. and Jan. but that westerlies prevail in other months. (*Same item as* 3.5–53, May 1952, *MAB.*) *Subject Headings:* **1. Upper air wind observations 2. Atmospheric circulation 3. Auckland, New Zealand 4. Hokitika, New Zealand.**—*I.L.D.*

4F–66 551.510.535

Berg, Hellmut, **Bemerkungen zur Meteorologie der Ionosphäre.** [Remarks on meteorology of the ionosphere.] *Geofisica Pura e Applicata,* 19(1/2):33–38, Jan./March **1951.** 3 figs., table, 8 refs. German and English summaries p. 33. **DLC**—Daytime echoes from ionosphere observed on the 80 m band during fall of 1942 at Cologne. Between Aug. 14 and Oct. 14, 1688 disturbances of E layer and 1977 disturbances of F2 layer were observed with prevailing direction from NE in E layer (in F2 layer no noticeable favored direction found) and speeds ranging from 10 to 370 m/sec for E and F2 layers, respectively. Explanation of this movement attempted, especially since it is not in agreement with movements observed at night by HOFFMEISTER ("Leuchtstreifen" at 120 km), and is about 90° from direction of winds at 10 km as observed from radiosonde ascents. (*Same item as* 2.8–48, Aug. 1951, *MAB.*) *Subject Headings:* **1. Ionospheric drift 2. Upper air winds 3. Cologne, Germany.**—*M.R.*

4F–67 551.501.8:06

Bowen, E. G., **Recent work of the Radiophysics Division, C.S.I.R.O.** *Institution of Radio Engineers, Australia, Proceedings,* 12:99–108, **1951.** 18 figs.—Vertical air velocity in a cloud was measured by airborne radar and cloud samples were taken. Wind finding by radar using balloons coated with a silver film gave profiles up to 100,000 ft. A glider carrying meteorological instruments and homing on a radio beam is being developed. Section 3 deals with radio astronomy. (For fuller abstract *see* 3.10–2, Oct. 1952, *MAB.*) *Subject Headings:* **1. Cloud physics 2. Radarsondes 3. Upper air wind observations 4. Stratosphere.**—*C.E.P.B.*

4F–68 551.557

Colon, Jose A., **On the wind structure above the tropopause over Puerto Rico.** *American Meteorological Society, Bulletin,* 32(2):52–53, Feb. **1951.** 2 tables, 3 refs. **MH-BH**—Results of

) soundings, to 20 km or more, given in form of wind roses for each km level from 1 km below the opopause (16–17 km s. l.) to 7 km above. At tropopause the prevailing winds change from W or W to ENE. Easterlies reach maximum frequency at 3 km above tropopause and are about 6 km ep. They are more pronounced in summer than in winter. (*Same item as* 2.11–118, Nov. 1951, *AB.*) *Subject Headings:* **1. Tropopause 2. Upper air winds 3. Krakatoa winds 4. San Juan, uerto Rico.**—*M.R.*

4F–69 551.524.7:551.557:551.510.53:551.596.1

*Denver. University. Institute of Industrial Research, **Determination of atmospheric winds nd temperatures in the 30- to 60-kilometer region by acoustic means.** Contract AF 19(122)-252, uarterly Progress Report No. 2, Jan. 15, **1951.** 35 p. fig., 8 tables. Also: *Ibid.*, No. 4, Oct. 17, **951.** 76 p. 2 figs., 10 tables, bibliog. p. 73–74. **DWB**—Data obtained between July 21 and Nov. , 1950, analyzed. Fifteen firings attempted at each of 8 sites, and results recorded and tabulated respect to detector-source distance and direction, travel time by direct and indirect paths, velocity acoustic waves and azimuth of reception of rays. Anomalous results often obtained, indicating gh temperature (110°C) or very high winds. Detailed results given for July 1950 firings and verage (T), wind direction and speed shown. Report No. 4 contains tabulated data for Dec. 950–June 1951 firings and description of activities, observations and theory of production of acoustic nergy by explosions. *Subject Headings:* **1. Stratospheric winds 2. Acoustical soundings. 3. Tem-erature of the stratosphere. I. Contract AF 19(122)-252 II. Richardson, John C. III. Huffsmith, . C.**—*M.R.*

4F–70 551.510.53

Dobson, G. M. B., **Recent work on the stratosphere.** *Royal Meteorological Society, Quarterly ournal,* 77(333):488–492, July **1951.** 2 figs., 9 refs. **MH-BH**—After referring to various lines of vestigation, author considers immediate problems—general circulation of whole world to 30 km or gher, radiative equilibrium of upper air, problems of ozone distribution and its variations (ob-rvations of ozone by moonlight are illustrated) and humidity of upper air. (*Same item as* 2.10–55, ct. 1951, *MAB.*) *Subject Headings:* **1. Stratosphere 2. Global circulation.**—*C.E.P.B.*

4F–71 551.557:551.501.8:551.506

Duncan, P. F., **Wind measurement at great heights.** *Aeroplane,* London, 80(2066):234–235, eb. 23, **1951.** photo, 7 refs. **DLC**—Review of balloon, optical triangulation and early radio ethods (reflection and fading) of determining high level winds with references to literature on each. ew method (1949) of radio investigation of Body-Döppler effect in echoes from meteor trails de-ribed briefly. Equipment used includes a radio transmitter operating at frequency of 23.1 Mc/sec, 17.3 Mc/sec pulsed transmitter to determine range, and special direction finding and sense indicating quipment. Turbulent winds of about 30 m/sec detected in ionosphere by this method. *Subject eadings:* **1. Ionospheric winds 2. Radio wind measurement 3. Döppler effect.**—*M.P.K.*

4F–72 551.510.535:551.557

Gerson, N. C., **Abnormal E region ionization.** *Canadian Journal of Physics,* 29:251–261, **951.** 10 figs., 12 refs. **DWB**—Cooperative work of North American Radio amateurs described. lovement and extent of sporadic E regions revealed by oblique incidence radio observations. Two ich centers observed on June 13, 1949. The velocity of the center of mass of the first area was bout 100 km/hour from the S.E. and of the second 270 km/hour from the S.S.E. *Subject Headings:* **Sporadic E layers 2. Ionospheric drift.**—*G.J.E.*

4F–73 551.510.535

Gerson, N. C., **Sporadic E movements on 21 June 1949.** *Tellus,* 3(1):56–59, Feb. **1951.** 6 figs. **IH-BH**—Data received from radio amateurs in the United States plotted on hourly charts (2400Z ine 20 to 0400Z June 21) to show westerly drift of sporadic E layer. Two centers appear, moving om upper Ohio Valley to Ozarks and from Missouri to Wyoming, respectively, although reports om the more western locations are quite scattered. (*Same item as* 2.11–59, Nov. 1951, *MAB.*) *ubject Headings:* **1. Ionospheric drift 2. Sporadic E layer.**—*M.R.*

4F–74 551.543:551.547.3

Haurwitz, Bernhard, **Atmospheric oscillation.** New York University. College of Engineering, ontract AF 19(122)-49, Progress Reports, Nos. 122-04 to 122-08, April 14, Oct. 24, **1950:** Jan. 14, pril 14, **1951.** 5 pieces. Diagrs., graphs, tables, refs. **DWB**—In the first of these five reports No. 122-04) effect of changes in solar radiation and consequent change in annual temperature range n the magnitude and distribution of pressure and the resulting atmospheric circulation over the obe are studied. In the second report (No. 122-05) effect of stability or lapse rate distribution

in the atmosphere, of the periodic winds in the upper stratosphere induced by solar and lunar tid and of magnetic storms on pressure in the mid-troposphere is discussed. In Report No. 122-0 effects of temperature and wind variations on the free periods of an autobarotropic atmosphere a worked out. In Report No. 122-07 the formula is worked out for computing the effect of vertic structure and zonal wind distribution of the free oscillations of the atmosphere. (For fuller abstra *see item* 3.5–211, May 1952, *MAB.*) *Subject Headings:* **1. Stratospheric winds. I. New Yor University. College of Engineering II. Contract AF 19(122)-49.**—*M.R.*

4F–75 **551.508.822:551.557.**

Jones, E. E., Hooper, J. E. N. and Alder, N. L., **The radar-sonde system for the measureme of upper wind and air data.** *Institution of Electrical Engineers, London, Proceedings*, 98, Pt. II(64) 461–469, Aug. **1951.** 11 figs., table, 10 refs. **DWB**—It is claimed that this new system of determin ing upper air wind direction and speed, and of telemetering temperature, pressure and humidit aloft to a slant range of 100 miles, is 10 times as accurate as previous instruments. Deficiencies i older systems in use in Europe and America, general ideas and details of the new instrument an receiver, and the wind computer are described and illustrated. The equipment has been develope by the Physics Dept. of the Telecommunications Research Establishment of Great Britain. Win as well as other elements are measured from pulses sent out by the radiosonde. All working part which would be affected adversely by temperature changes are well insulated. All recording auto matic. (*Same item as* 3.10–64, Oct. 1952, *MAB.*) *Subject Headings:* **1. Radarsondes 2. Upper ai wind measurement 3. Radiosondes.**—*M.R.*

4F–76 **551.511:551.524.7:551.557:551.51**

Kellogg, William W. and Schilling, Gerhard F., **A proposed model of the circulation in the uppe stratosphere.** *Journal of Meteorology*, 8(4):222–230, Aug. **1951.** 4 figs., 3 tables, 47 refs. **MH-BH** —Model is based on observation of wind (7 sources are listed), on temperature distribution (sources) and on 4 miscellaneous considerations (ozone distribution, total oscillation, dynamo theor and radiative equilibrium). In addition to elaborate schematic diagrams showing temperatur between isobaric surfaces (0–120 km) for all latitudes and a comparison between summer and winte temperature profile, a schematic representation of the circulation (wind direction, force and natur of flow) is given for the same cross section 90°N–90°S, and 0–120 km height. (*Same item as* 3.6–76 June 1952, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Stratospheric winds 3. Tem perature of the stratosphere.**—*M.R.*

4F–77 **551.557.3(52)**

Kobayashi, Y., **On the zonal component of upper wind at Tateno.** *Tateno, Japan. Aerologica Observatory, Journal*, 5(1):37–41, March **1951.** 3 figs. In Japanese, English summary p. 37.— Monthly means of the zonal component computed from pilot balloon and radio-tracking observations made during the period Sept. 1949–Sept. 1950, and values compared. Figures give isopleths o velocity of the zonal component for the year for both "Pibal" and "Rabal" (combined) and fo "Rawin" observations, for levels between surface and 25 km. Westerly components seen to exceed 70 m/sec between 8 and 14 km during period Dec. 1949–Feb. 1950. *Subject Heading:* **1. Upper air wind variations.**—*G.J.E.*

4F–78 **551.510.53:551.557(54)**

Koteswaram, P., **Physical properties of the upper atmosphere over India.** *Indian Journal of Meteorology and Geophysics*, 2(2):101–112, April **1951.** 8 tables, 7 figs., 24 refs. **MH-BH**—Tem perature, pressure, density and wind distribution at levels above 10 km discussed. Mean monthly geostrophic west wind components for levels between 10 km and 20 km have been computed between latitudes 20°N and 30°N. Strong westerly winds in winter and easterly winds during the summer monsoon are clearly seen. Winds above 20 km are discussed, but observational evidence is scanty. (*Same item as* 2.11–57, Nov. 1951, *MAB.*) *Subject Headings:* **1. Stratosphere 2. Stratospheric winds 3. India.**—*G.J.E.*

4F–79 **551.557**

Manning, Laurence A., **Windmessungen in der oberen Atmosphäre.** [Wind measurements in the upper atmosphere.] *Umschau*, Frankfurt a.M., 51(8):245–246, April **1951.** 2 figs. **DLC**— Popular report on measurement of wind velocity at heights of 50 to 70 miles, by radar echoes from ionization trails persisting after the passage of meteors, as carried out at Stanford University, California. An explanatory schematic drawing and data on wind velocity recorded during the summer 1949 is presented. (*Same item as* 3.7–144, July 1952, *MAB.*) *Subject Headings:* **1. Upper air wind measurement 2. Wind velocity.**—*G.T.*

4F–80 551.510.535:551.557

Millman, George H., **A note on ionospheric wind measurement at 150 Kc./s.** *Annales de Géophysique*, Paris, 7(4):272–274, Oct.–Dec. **1951.** 4 figs., table, 6 refs. **DWB**—Description of work done at the Ionosphere Research Laboratory, Pennsylvania State College. Method employed similar to that of KRAUTKRÄMER and MITRA. Polar diagram shows ionospheric wind observations obtained between 20.43 and 22.11 L.M.S.T. in July 1951. A northwesterly wind is predominant with speeds between 20 and 240 m/sec. Observations made between 03.49 and 05.19 hrs., and between 20.59 and 22.27 hrs. during August indicate diurnal variations. East and north-east winds in early hours replaced by south-east or south and south-west winds in later hours. (*Same item as* 3.1–156, Jan. 1953, *MAB.*) *Subject Heading:* **1. Ionospheric winds.**—*G.J.E.*

4F–81 551.506.1 551.506.7(261,492)

*Netherlands. (K.) Meteorologisch Instituut, **Upper air data and special synoptic observations. v. 30/31—, 1945/1946—.** Utrecht, **1951.** tables. **DWB**—This publication succeeded the annual publication, "Ergebnisse Aerologischer Beobachtungen," which ceased publication with No. 29, 1940. Observational data given for each ascent made at De Bilt and on the Ocean Weather Ship "Cirrus" (as from 1947). The latitude and longitude of ship given in each case. Wind data given to heights up to 22 km. (*Same item as* 3.11–48, Nov. 1952, *MAB.*) *Subject Headings:* **1. Upper air wind data 2. Yearbooks 3. Netherlands.**—*G.J.E.*

4F–82 551.506.7

Operation Moby Dick. *Weatherwise*, 4(6):123, Dec. **1951.** photo. **DWB**—A brief description of U. S. Air Force project to fly a series of controlled balloons across the U. S. at elevations of 50,000 to 100,000 ft in order to investigate the stratospheric wind systems. (*Same item as* 3.9–38, Sept. 1952, *MAB.*) *Subject Headings:* **1. Stratospheric winds 2. Pilot balloons 3. United States.**—*L.D.*

4F–83 551.557:551.510.535

Salzberg, C. D. and Greenstone, R., **Systematic ionospheric winds.** *Journal of Geophysical Research*, 56(4):521–533, Dec. **1951.** 7 figs., 16 refs. **DWB**—The horizontal drifts in the ionosphere were determined by a study of fading patterns of radio waves. The frequency distribution of apparent wind velocity is given. The velocity usually varies from 50 to 100 m sec^{-1} but may reach 200 in sec^{-1}. The average wind direction shows diurnal and remarkable seasonal variations but generally any direction can be observed. *Subject Headings:* **1. Ionospheric winds 2. Radio fading.**—*A.A.*

4F–84 551.557.2(82)

*Schwerdtfeger, Werner, **Ein kleiner Beitrag zur Kenntnis der aerologischen Verhältnisse über dem südlichen Patagonien.** [A small contribution to the knowledge of the aerological conditions over southern Patagonia.] *Meteorologische Rundschau*, 4(7/8):135–138, July/Aug. **1951.** 5 tables, 3 refs. German and English summaries p. 135. **MH-BH**—Seasonal winds at Rio Gallegas (51°40′S, 69°16′W) and Comodore Rivadavia (45°47′S, 67°30′W) up to 5000 m obtained by pilot balloon compared with radar winds over Falkland Islands. Radiosonde temperatures at Falkland Islands also discussed. (*Same item as* 3.2–128, Feb. 1952, *MAB.*) *Subject Headings:* **1. Upper air winds 2. Patagonia 3. Falkland Islands.**—*C.E.P.B.*

4F–85 551.510.53:551.524.7:551.557.3

Scrase, Frederick J., **Radiosonde and radar wind measurements in the stratosphere over the British Isles.** *Royal Meteorological Society, Quarterly Journal*, 77(333):483–488, July **1951.** 4 figs., table, 8 refs. **MH-BH**—Mean temperatures and winds up to 100,000 ft in winter and summer, derived from radiosonde ascents, are described. Changes from winter lapse to summer inversion and from the winter W to summer E "monsoon" illustrated. Annual variation of temperature shows a marked increase at 100,000 ft. (*Same item as* 2H–231, Aug. 1951, *MAB.*) *Subject Headings:* **1. Stratosphere 2. Upper air temperatures 3. Upper air wind variations 4. Radar observation.**—*C.E.P.B.*

4F–86 551.510.535:551.557

Winds and turbulence in the upper atmosphere. *Nature*, London, 167(4251):626–628, April 21, **1951.** table. **DLC**—An account of the geophysical discussion at the Royal Astronomical Society on Feb. 23. Mainly describes radio methods but P. A. SHEPPARD discussed the meteorology, suggesting that the high velocities reported (drifts up to 100 m/sec at heights of 250–300 km) were probably due to quasi-geostrophic flow in different directions at different levels. (*Same item as* 3.6–75, June 1952, *MAB.*) *Subject Headings:* **1. Turbulence effects 2. Ionospheric winds. 3. Ratcliffe, J. A.**—*C.E.P.B.*

4F–87 551.557.32:551.513

Yamada, H. and Matsuhashi, S., **On the winds aloft analysis by raob.** *Tateno, Japan. Aerological Observatory, Journal,* 5(1):20–31, March **1951.** 7 figs., 3 tables. English summary, p. 20 **DWB**—Analysis of mean conditions of upper winds using observations from one year. Authors distinguish a "Z-surface" with maximal wind velocity (about 200 mb) and an "E surface," where wind velocity becomes zero (above 20,000 m) and discuss their annual variation. Mean vertical cross sections show location of jet stream over Japan, which has the greatest intensity during the winter months between 10 and 15 km height. *Subject Headings:* **1. Upper air wind variations 2. Jet stream 3. Tropopause wind maximum 4. Japan.**—*A.A.*

4F–88 551.510.535:551.557

Yerg, Donald G., **Ionospheric wind systems and electron concentrations of the F layer.** *Journal of Meteorology,* 8(4):244–250, Aug. **1951.** 7 figs., table, 8 refs. **MH-BH**—Values of kinematic viscosity calculated for 0, 10, 50, 100, 150, 200, 250 and 300 km altitude, and found to agree in lower levels with similar data based on SUTHERLAND's formula (depending on temperature). Extrapolation of data in layer thickness versus mean free path indicates that beyond 400 km viscous effects decrease, so that a maximum of viscous action occurs below that level (perhaps at 200 km). Model proposed for circulation in stratosphere based on observed lapse rates, calculated winds and this study of viscous stresses. Slipping thought to occur about 200 km yielding east winds at all latitudes. Effects on ion concentration explain observed longitudinal variations in F2 layer. (*Same item as* 3.6–72, June 1952, *MAB.*) *Subject Headings:* **1. Ionospheric winds 2. Electron density 3. F layers.**—*M.R.*

4F–89 551.510.535:551.557

Yerg, Donald G., **Wind systems and longitudinal variations of critical frequency in F-layer.** *Journal of Meteorology,* 8(4):244–250, Aug. **1951.** 7 figs., table, 8 refs., 3 figs. **DWB**—Proposed model of atmospheric circulation at 100 to 300 km altitude, based on ionospheric data, described and illustrated graphically. Concentration of electrons in a belt some distance north of the equator explained on grounds of thermal expansion of atmosphere at this level at a time in the afternoon when the F-layer is lowering, thus allowing this portion of the F region to be influenced by the east-west circulation: the west winds of the equatorial belt converging with the winds of the middle latitudes in this zone. (*Same item as* 3.6–72, June 1952, *MAB.*) *Subject Headings:* **1. Ionospheric wind theory 2. F layer critical frequencies.**—*M.R.*

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4F–90 551.596.1

aufm Kampe, Hans-Joachim, **Ergebnisse der Schallmessung Helgoland.** [Results of acoustic measurement at Heligoland.] *Meteorologische Rundschau,* 5(5/6):99–105, May/June, **1952.** 12 figs., 2 tables, 3 eqs. **DWB**—On April 18, 1947, 6000 tons of explosive were set off at Heligoland; normal and anomalous waves recorded at German stations are charted up to a distance of 440 km. Results discussed in light of upper winds and temperatures and the weather situation, and the paths of anomalous waves plotted, with some alternative solutions. Above tropopause at 10 km a rise of temperature is determined, to a value of nearly 50°C at 50 km. (*Same item as* 4.3–295, March 1953, *MAB.*) *Subject Headings:* **1. Explosion waves 2. Upper air winds 3. Heligoland.**—*C.E.P.B.*

4F–91 551.557.36(53)

Austin, E., **Upper winds of Aden.** *Great Britain. Meteorological Research Committee, M.R.P.* 729 (rev.), July, **1952.** 3 p. 6 figs.—Discussion of radar wind observations at Aden, Aug. 1948–Dec. 1950. Frequency tables derived for 14 levels from surface to 40 mb. Outstanding feature is strong easterly wind above 300 mb in summer months with a July maximum of over 70 knots at 150–100 mb level. Wind roses given showing total flow from each direction for each month and for levels between 850 and 100 mb. *Subject Headings:* **1. Upper air wind frequencies 2. Upper air wind roses 3. Aden.**—*G.J.E.*

4F–92 551.596.1:551.524.7:551.557.2

Crary, A. P., **Stratosphere winds and temperatures in low latitudes from acoustical propagation studies.** *Journal of Meteorology,* 9(2):93–109, April **1952.** 22 figs., 8 tables, 11 refs. **MH-BH**—Tests of sound-ranging method (*see item* No. 8–146, Aug. 1950, *MAB*) near Hawaii, Canal Zone, Bermuda and Florida described and velocity-height curves up to 40–60 km (100–120 km near Florida) presented. Most probable temperatures and winds deduced. Results confirm earlier studies, showing light winds over continental areas in low latitudes in winter and low temperatures and high winds over oceanic areas. Sources of error in this experimental method discussed. (*Same item as* 3.9–240, Sept. 1952, *MAB.*) *Subject Headings:* **1. Acoustical soundings 2. Upper air temperatures 3. Upper air winds.**—*C.E.P.B.*

4F–93 551.510.535:551.557

Dieminger, W., **Bewegungsvorgänge in der Ionosphäre.** [Movement processes in the iono-)here.] *Germany. Deutscher Wetterdienst in der U. S. Zone, Berichte,* No. 35:224–227, **1952.** refs. **DWB**—Methods of observing movements of electron concentrations and results obtained iscussed. Author concludes that movements are due to true winds. *Subject Heading:* **1. Iono-)heric winds.**—*G.J.E.*

4F–94 551.508.57:551.557

Edwardes, H. N., **Some measurements of velocity of high altitude winds at Sydney, N.S.W.** *merican Meteorological Society, Bulletin,* 33(2):56–59, Feb. **1952.** 2 figs., 3 tables. 6 refs. **DWB**— mall silver-coated balloon, inflated inside carrier balloon, used as radar reflector. Experiments arried out during March–Aug. 1949. Results show maximum velocity of 70 m.p.h. at 40,000 ft rom a westerly direction and minimum of 5 m.p.h. at 70,000 ft. Both maximum and minimum vels showed fair constancy, not deviating by more than 10,000 ft. (*Same item as* 4.1–155, Jan. 953, *MAB.*) *Subject Headings:* **1. Upper air wind measurement 2. Stratospheric winds 3. Syd-ey, Australia.**—*G.J.E.*

4F–95 551.510.535:551.557

Gerson, Nathaniel C., **Bewegungen der abnormalen E-Schicht der Ionosphäre.** [Movements f the abnormal E-layer of the ionosphere.] *Zeitschrift für angewandte Physik,* 4(3):81–82, March 952. 3 figs. **DWB**—Observations of E_s "clouds" (with help of radio amateurs) at about 110 km n U. S. June 16–17, 1949, plotted. One in the north-east moved from E.N.E. at 130 km/hr. A naller one in 100°W moved from S.S.E., 300 km/hr, and a third near 40°N, 115°W moved from E t 100 km/hr. The sudden appearance and disappearance of the clouds attributed to vertical move-ents. *Subject Heading:* **1. Ionospheric winds.**—*G.J.E.*

4F–96 551.510.41 551.510.5

Gerson, Nathaniel C., **The terrestrial atmosphere.** *Science Progress,* London, 40:245–254, **1952.** tables. **DLC**—Short survey almost entirely devoted to structure of layers above 100 km. Iono-)heric temperature and winds, aurora and the airglow are briefly discussed. *Subject Heading:* **Ionospheric winds.**—*G.J.E.*

4F–97 551.510.53 551.557

Gerson, N. C., **Unsolved problems in physics of the high atmosphere.** *Advances in Geophysics,* . Y., 1:234–242, **1952.** 12 figs., 177 refs. **DLC**—Surveys of much of the existing knowledge of ne high atmosphere including a section of wind observations summarizing the results of observations f ionospheric irregularities and of "cloud" movements. "Clouds" are used here to mean (a) octilucent clouds (b) luminous clouds (c) clouds in the air-glow and (d) sporadic E ionizations. igs. 7–12 summarize the observations. *Subject Heading:* **1. Ionospheric winds.**—*G.J.E.*

4F–98 551.506.7

*Great Britain. Meteorological Office, **Upper air data for stations maintained by the Meteoro-)gical Office. Summaries of radiosonde observations of temperature and humidity and of radar ind measurements at standard pressure levels 1946–50. Part 1. Larkhill.** London, H. M. tationery Office, **1952.** 52 p. 4 pl. **GB-MO**—Monthly frequencies of wind direction and speed, ith resultants and standard vector deviations at standard pressure levels, 1948–50. Pressure vels considered are from surface up to 40 mb for frequencies of wind direction and speeds, and from 50 mb up to 100 mb for resultant winds and standard vector deviations. (For similar data for erwick, England, *see ibid.,* Pt. 2, 1952. 52 p. 4 plates. M.O. 555.) *Subject Headings:* **1. Upper r data 2. Upper air wind data 3. Larkhill, England 4. Lerwick, England.**—*G.J.E.*

4F–99 551.590.25:551.501.81

Greenhow, J. S., **Characteristics of radio echoes from meteor trails: III. The behaviour of the ectron trails after formation.** *Physical Society of London, Proceedings, B,* 65:169–181, **1952.** 10 gs., 2 plates, 17 refs., 11 eqs. **DWB**—Amplitudes of long duration echoes from meteor trails show, perposed on steady decrease due to diffusion, fluctuations of period 0.04 to 0.4 sec (at 8.4 m), tributed to distortion of the trail by turbulence. Turbulent winds of about 20 m/sec are inferred heights of 80–100 km. (*Same item as* 4.1–254, Jan. 1953, *MAB.*) *Subject Headings:* **1. Meteor ails 2. Ionospheric turbulence 3. Ionospheric winds 4. Radio echoes.**—*C.E.P.B.*

4F–100 551.501.81:551.557.3:523.51

Greenhow, J. S., **A radio echo method for the investigation of atmospheric winds at altitudes of) to 100 km.** *Journal of Atmospheric and Terrestrial Physics,* London, 2(5):282–291, **1952.** 8 figs.,) refs. **MH-BH**—Technique discussed for measuring amplitude fluctuations of meteor echoes and

for observations of the pulse shape and range drifts. The transmitter operated on 8.4 m wavelengt with a peak power of 150 kw. Uniform winds measured from steady drifts in range of long duratio echoes show velocities of 50 m/sec. A reversal of direction of these winds occurs between 0100 an 0200 hrs local time from a N–S to a S–N direction. Variable winds present at all times in the mete region. Velocities at height differences of 5–10 km may differ by as much as 50 m/sec. Auth suggests that rapid changes in speeds and directions of uniform winds measured by other worke are due to these large variations of wind velocity with height. *Subject Headings:* **1. Upper air wind 2. Meteor trails 3. Radio echoes.**—*G.J.E.*

4F–101 551.557(59

*Hay, R. F. M., **Wind at high levels over Singapore (1950–52).** *Great Britain. Meteorologic Research Committee, M.R.P.* 770, Nov. 17, **1952.** 6 p. 2 figs., 6 tables, 4 refs. Mimeographe **GB-MO**—Summary of 149 radar observations, 101 above 55,000 ft and 18 above 70,000 ft. Easter lies are found above 25,000 ft, very strong (some over 90 knots) in 48,000–54,000 ft. There is strong shear at about 60,000 ft to SW, sometimes exceeding 10 knots/1000 ft. Tables show vecto resultants at each month and height, scalar speeds, highest speeds and corresponding heights, shea values and frequencies integrated through layers. *Subject Headings:* **1. Upper air winds 2. Singa pore.**—*C.E.P.B.*

4F–102 551.510.535:551.557:523.8

Hewish, A., **The diffraction of galactic radio waves as a method of investigating the irregula structure of the ionosphere.** *Royal Society of London, Proceedings, Ser. A*, 214(1119):494–514 Oct., **1952.** 13 figs., table, 16 refs. **DLC**—Variations in phase and amplitude of radio waves receive from a radio star, at two points 1 km apart, ascribed to steady drift of an irregular wave pattern This pattern can be considered as a diffraction pattern produced by passage through the ionosphere Ionospheric irregularities studied and seen to be at a height of 400 km and to move with a speed o 100 to 300 m/sec. The speed decreases after midnight. Large velocities are associated with mag netic disturbances. *Subject Headings:* **1. Radio stars 2. Ionospheric winds.**—*G.J.E.*

4F–103 551.557:551.513

†Jenkins, C. F., **A survey of available information on winds above 30,000 feet.** *U. S. Air Force Cambridge Research Center, Air Force Surveys in Geophysics*, No. 24, Dec. **1952.** 35 p. 3 figs., table 58 refs. **DWB**—A valuable annotated review of published references to winds up to 400,000 ft Attempt made to construct a meridional cross section for the whole earth. There may be westerlies in all layers during winter with severe turbulence at 100,000 ft, strong west winds (100 mph) up t 200,000 ft, strong vertical motions from 200,000 to 300,000 ft and strong southwest (150 mph winds above. Summer picture more complicated. West winds observed only up to 65,000 f but also probably exist above 350,000 ft. In the layer between, east winds with increasing spee are likely (from 25 to 150 mph in the higher layers). Large diurnal variations, extreme turbulence and large vertical motions apparent in the stratosphere. Author believes that "the stratospheri circulation is essentially independent of the tropospheric circulation and . . . is probably largely influenced by absorption of solar radiation in the stratosphere." Table of wind direction and spee from 10–50 km presented, computed from observations of sound propagation made during one yea at 40°N. *Subject Headings:* **1. Stratospheric winds 2. Stratospheric circulation 3. Meridiona cross sections.**—*A.A.*

4F–104 551.501.7:551.557

Johnson, D. H., **A note on the accuracy of 100 mb winds.** *Great Britain. Meteorologica Research Committee, M.R.P.* 739, S.C.II/112, July **1952.** 3 p. fig., 2 refs. **DAWS.** Also: *Meteoro logical Magazine*, London, 82(968):44–46, Feb. **1953. DWB**—A statistical test is made of win reports from Aldergrove, Liverpool and Downham Market. The standard vector errors of 100 mb wind reports are seen to be generally less than 6 knots. Results confirm earlier works by BANNON (*Same item as* 4.4–31, April 1953, *MAB.*) *Subject Headings:* **1. Upper air winds 2. England.**— *G.J.E.*

4F–105 551.557:551.510.535:621.39

Jones, R. E., Millman, George H. and Nertney, R. J., **Scientific report on the heights of iono spheric winds as measured at long radio wavelengths.** Pennsylvania. State College, Ionospheri Research Laboratory, Contract AF 19(122)-44, Scientific Report No. 36, April 30, **1952.** 18 p 12 figs., 22 refs., 14 eqs. **DWB**—Existence of ionospheric winds can be shown using results obtaine from spaced receivers. Height of these winds must be at or below reflection level of frequency use (in this case 150 Kc/s' pulses). Method for obtaining this additional information developed an frequency distribution of apparent wind heights given. Daytime wind heights estimated at abou

5 km and night winds at 83–100 km. (*Same item as* 4.3–185, March 1953, *MAB.*) *Subject Headings:* **1. Ionospheric winds 2. Radio wave reflection. I. Pennsylvania. State College II. Contract AF 19(122)-44.**—*A.A.*

4F–106 551.593.653:551.510.53

KHvostikov, E. A., **Serebristye oblaka.** [Noctilucent clouds.] *Priroda,* Moscow, 5:49–59, May **1952.** 8 figs., 12 plates, 3 refs. **DLC**—Author summarizes the results of observations during most 60 years in Russia, Germany and Norway and shows that the most remarkable phenomenon is the stability of the height of the clouds, determined as about 82 km above sea level. Great speeds up to scores of m/sec in a westerly direction observed. Thermal and moisture conditions in the stratosphere and lower ionosphere as related to cloud formation analyzed. (*For fuller abstract see item* 4.2–276, Feb. 1953, *MAB.*) *Subject Headings:* **1. Noctilucent clouds 2. Ionospheric winds Stratospheric winds.**—*N.T.Z.*

4F–107 551.501.7:551.510.535:551.557

Maxwell, A. and Little, C. G., **A radio-astronomical investigation of winds in the upper atmosphere.** *Nature,* London, 169(4305):746–747, May 3, **1952.** 5 figs., 3 refs. **DLC**—Fluctuations in intensity of extra-terrestrial radiation from two of most intense radio-stars in constellations Cygnus and Cassiopeia were recorded at three receivers arranged triangularly 4 km apart and operating at a frequency of 80 Mc/s. Motion of diffraction pattern caused by nocturnal F region irregularities calculated, and shows these ionospheric irregularities to have a steady translational movement, average velocity being 350 km/hr from an easterly direction. On two occasions a change in direction of 140° was noted within an hour. (*Same item as* 3.10–200, Oct. 1952, *MAB.*) *Subject Headings:* **Radio wind measurement 2. Ionospheric winds.**—*G.J.E.*

4F–108 551.524.7 551.557

Miles, M. K., **Temperature and wind distribution in the lower stratosphere.** *Meteorological Magazine,* London, 81(961):212–215, July **1952. DWB**—Layer between 200 mb and 100 mb considered, using Central Forecast Office charts. Winds at 100 mb show remarkable constancy over large areas, although wind near tropopause may be undergoing large changes. Deduced that at 100 mb the flow is probably geostrophic. Winds in lower stratosphere are generally strongest in Dec. and Jan. but large departures are expected from mean. Vertical motion briefly considered. (*Same item as* 4.3–155, March 1953, *MAB.*) *Subject Headings:* **1. Stratospheric winds 2. Upper air temperatures.**—*G.J.E.*

4F–109 551.510.535:551.551:551.557:551.594.7

Millman, George H., **A study of ionospheric winds and turbulence utilizing long radio waves.** Pennsylvania State College. Ionospheric Research, Contract AF 19(122)-44, Scientific Report, No. 37, May 30, **1952.** Also: *Annales de Géophysique,* 8(4):365–384, Oct./Dec. **1952.** 14 figs., 3 tables, 36 refs. **MH-BH, DWB**—Work mainly concerned with study and experimental determination of wind movements in E layer of ionosphere by radio pulse techniques at a frequency of 150 Kc/sec and statistical analysis of fading of vertically incident pulsed 150 Kc/sec radio waves. Evidence indicates presence of diurnal and seasonal variations of upper atmospheric wind movements. July 1951–March 1952 statistically analyzed and compared with theoretical postulates. *Subject Headings:* **1. Ionospheric winds 2. Radio wind measurement 3. Ionospheric turbulence. I. Pennsylvania State College II. Contract AF 19(122)-44.**—*Author's abstract.*

4F–110 551.510.5(02)

†*Mitra, Sisir Kumar, **The upper atmosphere.** 2d ed. Calcutta, The Asiatic Society, [Preface 1952]. 713 p. figs., tables, eqs., bibliog. p. 644–668. **MH-BH**—Of the almost 100 pages of new material added since the first edition (1947) part deal with radar studies of meteors (Chap. III); ionospheric sounding by radio waves, tides and travelling disturbances in the ionosphere (Chap. VI); rocket exploration of upper atmosphere (Chap. XII); and winds at high levels as determined by indirect methods (Chap. XIII). (Fuller abstract to appear soon in *MAB.* For abstract of 1st ed. see 1–57, Jan. 1950, *MAB.*) *Subject Headings:* **1. Ionospheric winds 2. Upper atmosphere physics Textbooks.**—*M.P.K.*

4F–111 551.506.1 551.557.2(54)

Pakistan. Meteorological Dept., **Upper air data, 1948. Monthly means of pilot balloon data.** [Karachi] **1952.** 36 p. **GB-MO**—Monthly mean direction and speed of winds given for 17 stations for 13 levels between surface and 9 km. Above 9 km, heights reached vary with stations and months. Values given up to 22 km for Karachi in June and up to 33 km. (1 observation) for Khanpur in November. *Subject Headings:* **1. Upper air wind data 2. Pakistan.**—*G.J.E.*

4F–112 551.557.3:551.510.53

Phillips, G. J., **Measurement of winds in the ionosphere.** *Journal of Atmospheric and Terrestrial Physics*, London, 2(3):141–154, 1952. 8 figs., 17 refs. **DWB**—Movements of diffraction pattern recorded by sender at Cambridge, England, emitting 50 pulses/sec on 2.4 Mc/s with 4 receiving aerials 130–260 m apart. These are considered to show air motion at 100–120 km height. Diurnal variations shown for each month Feb. 1949–June 1951 and harmonic components plotted on dials. They partly represent a solar tide with amplitude 16 m/s. Most frequent velocities were 50–100 m/sec in summer, 60–120 in winter; in magnetic storms very high speeds from E were found. Monthly resultants very scattered, with means around 40 m/sec from W in May–Aug., 30 m/s from ENE in other seasons. (*Same item as* 3.9–165, Sept. 1952, *MAB.*) *Subject Headings:* **1. Ionospheric winds 2. Upper air wind measurement 3. Upper air wind frequencies 4. Cambridge, England.**—*C.E.P.B.*

4F–113 551.577.2(931)

Porter, Elizabeth M., **Upper winds over Invercargill.** *New Zealand. Meteorological Office, Technical Note*, No. 94, **1952.** 2 p. 2 tables, 4 figs., ref. Mimeo. **GB-MO**—Radar wind observations made at Invercargill (46°25′S, 168°19′E) between June 1951 and Oct. 1952 used to give mean wind vectors for each month at levels up to 80,000 ft. Strongest mean westerly winds found at 30,000 to 35,000 ft in spring, summer and autumn, with easterlies above 65,000 ft in late spring and summer. In winter, mean winds were westerly at all levels with a broad maximum between 50,000 and 70,000 ft. *Subject Headings:* **1. Stratospheric winds 2. Invercargill, New Zealand.**—*G.J.E.*

4F–114 551.557.2(93)

Porter, Elizabeth M., **Upper winds over Nandi and Auckland.** *New Zealand Meteorological Office, Technical Note*, No. 92, **1952.** 3 p. 4 tables, 4 figs., 6 refs. Mimeo. **DWB**—Wind observations made by radar tracking of balloons at Nandi (Fiji) during broken periods between Aug. 1945 and Aug. 1952 and at Auckland between Oct. 1944 and Dec. 1951 used to compute monthly and seasonal mean wind vectors and standard vector deviations about the mean. Values tabulated up to 80,000 ft over Auckland and to 70,000 ft over Nandi. Level of strongest winds at all seasons about 45,000 ft. *Subject Headings:* **1. Stratospheric winds 2. Auckland, New Zealand 3. Nandi, Fiji.**—*G.J.E.*

4F–115 551.510.535:551.557:523.82

R——, G., **Radioastronomicheskie izmereniia napravleniia i skorosti vetrov v vysokikh sloiakh atmosfery.** [Radioastronomic measurements of direction and velocity of winds in upper atmospheric layers.] *Uspekhi Fizicheskikh Nauk*, Moscow, 48(1):138–143, Sept. **1952.** 2 figs., 9 refs. **DLC**—Review based mostly on foreign papers, emphasizing the use of "radio stars" in measuring fluctuations due to ionospheric disturbances. Tentative data for dimensions of disturbances, drift direction and speed and vertical velocity given. Wind roses and histograms for wind frequencies in F2 layer are presented for: a) May–June 1951 at 60°N and b) Sept.–Oct. 1951 at 53°N. Data compiled for various levels 80–250 km for U.S.A., England, Germany and Australia. *Subject Headings:* **1. Ionospheric winds 2. Radioastronomic measurements.**—*A.A., M.R.*

4F–116 551.557

Ramaswamy, C., **Winds at 40,000 feet and above over Calcutta during the southwest monsoon period.** *Indian Journal of Meteorology and Geophysics*, 3(2):157–158, April **1952.** **DWB**—Results of few special pilot balloon ascents in early Sept. 1951 in connection with test flight of the "Comet" airliner represent the only high level information available for this area. Easterlies appear to extend up to 70,000 ft and to increase with height at least up to 65,000 ft where the speed is of the order of 40 knots. *Subject Headings:* **1. Monsoons 2. Upper air winds 3. Calcutta.**—*G.J.E.*

4F–117 551.508.21:551.510.535:551.524.7:551.557

Richardson, J. M. and Kennedy, W. B., **Atmospheric winds and temperatures to 50-kilometers altitude as determined by acoustical propagation studies.** *Acoustical Society of America, Journal*, 24(6):731–741, Nov. **1952.** 9 figs., 2 tables, 20 refs. **DLC**—Between July 1950 and May 1951 500 charges of 200 lb each of TNT were fired thus obtaining an average of three sets of data per month sufficient for calculation of high altitude winds and temperatures over Wray (40°N, 102°W). Winds generally westerly and of large magnitude during winter and light easterly during summer with large fluctuations during equinoctial periods. Temperatures, wind speeds and azimuth at 5 km intervals to 50 km for each set of observations tabulated. *Subject Headings:* **1. Acoustical soundings 2. Ionospheric winds 3. Ionospheric research 4. Wray, Colorado.**—*G.J.E.*

4F–118 551.501.81:551.557.3(43)

*Richter, K. H., **Ergebnisse aus Radar-Höhenwindmessungen in Hannover-Langenhagen.** Results of radar upper wind measurements in Hanover-Langenhagen.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:331–338, **1952.** 7 figs., 4 tables, 7 refs. **DWB**—Mean scalar and vector wind velocities at levels ground to 80 mb tabulated monthly June 1948–May 1949 and discussed in detail. Steadiness computed. Diurnal variation of scalar velocity (winter, summer, year) shown by isopleths (maximum around 300 mb, 2 h in winter, 10 h in summer and year.) *Subject Headings:* **1. Upper air winds 2. Hanover-Langenhagen, Germany.**—*C.E.P.B.*

4F–119 551.510.7:551.510.535:551.590.25

Whipple, Fred L., **Exploration of the upper atmosphere by meteoritic techniques.** *Advances in Geophysics*, N. Y., 1:119–154, **1952.** 7 figs., 3 tables, 74 refs. **DWB**—A comprehensive review of the entire field of meteor observation and the use of meteors in upper atmosphere research. Meteors, meteorites and meteoroids; meteoritic dust, or micro-meteorites; meteor trails and meteor trains, meteor showers, etc. are defined or distinguished one from another. Visual, photographic, spectral, radio and micro-meteoritic techniques in observation and results therefrom are discussed in separate paragraphs. Use of this data and theories pertinent thereto, in determining the density, temperature and pressure of the stratosphere and, finally, the estimation of winds at the 40 to 110 km levels from meteor train observations, and recently from radio reflection (Body-Döppler) measurements involving ionization, persisting after the meteor has been consumed, are summarized. *Subject Headings:* **1. Meteor research 2. Ionospheric winds 3. Structure of the stratosphere 4. Reviews.**—*M.R.*

1953

4F–120 551.510.535:551.557

Chapman, J. H., **A study of winds in the ionosphere by radio methods.** *Canadian Journal of Physics*, Ottawa, 31:120–131, Jan. **1953.** 9 figs., 3 tables, 11 refs. **DWB**—MITRA's technique, with pulse transmitter between 2 and 6 Mc in central recording station and three receiving antennas at corners of a right-angled triangle to measure fading, was used over a one year period. Mean daily wind variation of almost semi-diurnal period of about 40 meters per second amplitude observed at E layer. In F region, mean wind velocity increases regularly with an increase of K-index. Tidal variations not detected in F region. *Subject Headings:* **1. Ionospheric winds 2. Radio fading.**—*G.J.E.*

4F–121 551.510.535:551.557

Findlay, J. W., **Moving clouds of ionisation in region E of the ionosphere.** *Journal of Atmospheric and Terrestrial Physics*, London 3(2):73–78, Feb. **1953.** 7 figs., 7 refs. **DLC**—During more than 2000 hours of daytime observation, 110 echoes were seen from lower part of E layer. Echoes lasted from 3 to 20 minutes. Changes of phase were quite distinct and different from the changes of phase of the echoes from the actual E layer. They were interpreted as coming from clouds of ionization moving with a constant velocity. Changes of phase path with time suggest clouds were moving with velocities between 20 m/sec and 150 m/sec. Average diameter of clouds about 700 m. *Subject Headings:* **1. Ionospheric winds 2. Sporadic E layer.**—*G.J.E.*

4F–122 551.510.535:551.557

Jones, R. E., Millman, George H. and Nertney, R. J., **The heights of ionospheric winds as measured at long radio wavelengths.** *Journal of Atmospheric and Terrestrial Physics*, London, (2):79–91, Feb. **1953.** 7 figs., 13 refs. **MH-BH**—Use of delta phase height equipment for obtaining heights at which ionospheric winds occur show daytime winds at about 75 km level and night-time winds at between 83–100 km. *Subject Heading:* **1. Ionospheric winds.**—*G.J.E.*

4F–123 551.510.535:551.557(94)

Munro, G. H., **Travelling disturbances in the ionosphere: diurnal variation of direction.** *Nature*, 71(4355):693–694, April 18, **1953.** fig., ref. **DWB**—Observations in Sydney, Australia, in 1950, 1951 and 1952 show a steady change in direction of movement, towards 50°E of N at 0930 to 15° at 1430 h. At night component of motion is consistently E–W. *Subject Headings:* **1. Ionospheric winds 2. F layers 3. Sydney, Australia.**—*C.E.P.B.*

SUPPLEMENTARY MATERIAL

4F–124 551.557.36(682)

Hofmeyr, W. L., **A statistical analysis of radar winds over Pretoria in winter.** *South Africa. Weather Bureau, Notos*, 1(4):186–192, **1952.** 7 tables, 4 figs., 6 refs. **DWB**—Frequencies are given for 16 sectors of azimuth for 9 levels up to 60 mb. Average velocities show a mainly westerly

maximum of the order of 60 knots at 200 mb. Above this level there is a rapid decrease in speed with directions becoming variable. W–E and S–N components and their standard deviations are given for each level. *Subject Headings:* **1. Upper air wind frequencies 2. South Africa.**—*G.J.E.*

4F–125 551.551:551.557 551.524.1:551.524.7

Scrase, F. J., **Turbulence in the upper air, as shown by radar-wind and radio-sonde measurements.** *Great Britain. Meteorological Research Committee, M.R.P.* 771, Nov. 21, **1952.** 9 p. 4 figs., 2 tables, 20 refs., eqs. Mimeo. **DWB**—After allowing for random errors, eddy velocities were obtained from minute by minute radar winds on a radiosonde up to 30 km over Kownham Market. Mean wind 25 knots, fluctuations 5–10 knots in periods of 3–4 min. Temperature fluctuations were 0.85°F in troposphere and 0.64°F in lower stratosphere. Results are used to estimate momentum, and heat fluxes and coefficients of eddy diffusion and their bearing on the theory of heat diffusion is discussed. *Subject Headings:* **1. Upper air temperatures 2. Upper air turbulence.**—*C.E.P.B.*

4F–126 551.510.535

Hines, C. O., **Wave hypothesis of moving irregularities in the ionosphere.** *Nature*, London, 171(4361):980, May 30, **1953.** 3 refs. **DWB**—The suggestion that the so-called "winds" may be due to a propagated wave-like disturbance is investigated by an examination of the magneto-hydrodynamic effects involved. Encouraging results are obtained in association with the large scale F2 region disturbances observed by MUNRO. *Subject Heading:* **1. Ionospheric disturbances.**—*G.J.E.*

4F–127 551.557

Palmer, Clarence E., **The Central Pacific Project.** California. University. Institute of Geophysics, Contract AF 19(122)-414, 1st Quarterly Report, Append. A, Oct. **1951.** Summarized and supplemented in: *Ibid.*, Final Report, March **1953.** p. 3–5. **DWB**—Discussion of "all high level winds (above 55,000 ft) in the JTF III data in an attempt to discover whether an equinoctial reversal in stratospheric winds occurred in the low latitudes of the Marshall Islands and their environs such as observed in the high latitudes of North America and Europe." Meager data north of 10°N indicated reversal. Ampler data for 10°N—equator, spring of 1946 and 1951, showed no reversal between 55,000 and 85,000 ft. Observations at Nauru, Bikati, Kusaie and Majuro (between equator and 7°N, 163 and 172°E) "revealed existence of belt of steady westerly upper winds between 60,000 and 85,000 ft." Speculation advanced that three standing waves probably lie along the equator in the zonal flow. Recent U. S. Navy observations at Palmyra confirm existence of "upper equatorial westerlies" in a region 2000 mi east of the Marshalls. *Subject Headings:* **1. Stratospheric winds 2. Upper equatorial westerlies 3. Equatorial Pacific. I. California. University. Institute of Geophysics II. Contract AF 19(122)-141.**—*M.P.K.*

4F–128 551.557.2

U. S. Weather Bureau, **Charts of average dynamic height in geopotential meters (1 g.p.m. = 0.98 dynamic meters) of the 850 mb. Pressure, surface, average temperature in °C. at 850 mb, and resultant winds at 1500 (3000, 5,000, 10,000) meters (m.s.l.).** *Monthly Weather Review.* Latest issue received, 81(3), March **1953.** Charts. **DWB**—Monthly feature showing upper air winds at each of four levels using pilot balloon and rawin data. *Subject Heading:* **1. Upper air wind charts.**—*M.P.K.*

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section are for information only, and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of date of publication, the pagination may be omitted.

merican Meteorological Society, Bulletin, Volume 34, Number 4, April 1953.

Fawbush, Ernest J. and Miller, Robert C.: **The tornado situation of 17 March 1951**, p. 139–145.
Rush, C. K. and Baxter, D.: **Thermodynamic limitations of ice accretion instruments**, p. 146–154.
Fletcher, Robert D.: **The association of wind speed with height of upper-air constant-pressure surfaces**, p. 155–159.
Myers, Vance A.: **A method of reducing sea-level pressure to 1000-mb height for upper-air evaluations**, p. 160–162.
Vonnegut, Bernard and Neubauer, Raymond L.: **Counting sodium-containing particles in the atmosphere by their spectral emission in a hydrogen flame**, p. 163–169.
Fowler, J. R.: **An improved bimetallic actinograph**, p. 170–174.
American Meteorological Society 123rd National Meeting—June 16–18, 1953, p. 175–180.

ngewandte Meteorologie, Berlin, Volume 1, Number 9, February 1953.

Unger, K. and Miller, H. J.: **Studien über die Bedeutung von Witterung und Mikroklima für den Massenwechsel der Schwarzen Bohnenlaus (Doralis fabae Scop.)**, [Studies on the importance of weather and microclimate for the metamorphosis of the bean blackfly], p. 257–275.
Hesse, W.: **Karte der Vegetationsperiode**, [Chart of the vegetation period], p. 276–278.
Unger, K.: **Bodenfeuchtigkeit und Asternwelke**, [Soil humidity and withering of asters], p. 278–280.
Unger, K.: **Thermoelementpsychrometer für mikroklimatische Messungen**, [Thermoelement psychrometer for microclimatic measurements], p. 280–283
Hentschel, G.: **Meteorotropismus im Tagesrhytmus des menschlichen Befindens**, [Meteorotropism in the daily rhythm of human health], p. 283–288.

nnalen der Meteorologie, Medizin-Meteorologische Hefte, Hamburg, No. 8, 1953.

Lampert, H. and Pirlet, K.: **Die physikalisch-diätetische und Klimato-Therapie als causale Konstitutionstherapie und die daraus Konstitutionstypeneinteilung**, [Physical dietic and climatic therapy as causative constitution therapy and the resulting types of constitution evaluated therapeutically], p. 2–4.
Pirlet, K.: **Welche Gesichtspunkte sind bei einer Konstitutionstypeinteilung zu Berücksichtigen und welche diagnostische Möglichkeiten ergeben sich heraus?**, [What points of view are to be considered in classifying constitutions and what diagnostic possibilities result?], p. 5–11.
Rückheim, G.: **Über das Grundprinzip der biologischen Reaktion des Menschen**, [On the basic principle of human biological reaction], p. 11–15.
Jungmann, H.: **Über den Einfluss der vegetativen Struktur des einzelnen Menschen auf den Erfolg klimatischer Behandlung**, [On the influence of the vegetative structure of individual men on the result of climatic treatment], p. 15–21.
Becker, F.: **Arbeits-Angina pectoris und Wetter**, [Strained heart and weather], p. 21–24.
Leistner, Walter: **Der Verlauf individueller Leukozytenkurven in Abhängigkeit vom Witterungsgeschehen**, [The course of individual leucocyte curves in relation to weather phenomena], p. 8–24.
Bartels, Julius: **Zur statistischen Methodik**, [On statistical methods], p. 39–43.
Straube, G.: **Die bioklimatische Diagnostik und Therapie in der klinischen Praxis**, [Bioclimatic diagnostics and therapy in clinical practice], p. 68–74.
Seilkopf, Heinrich: **Biosynoptik**, [Biosynoptics], p. 74–83.

Daubert, Karl: **Biometeorologische Ergebnisse des Tübinger Arbeitskreises,** [Biometeorological results of the Tübingen working group], p. 83–95.

Zink, Otto: **Über die Beeinflussung der Hypertonie und Herzinsuffizienz durch Wetterfaktoren,** [On the effect of weather factors on hypertonia and heart weakness], p. 95–98.

Harry, Walter: **Lebensbedrohliche Zustände nach Venen-Injektionen, zum Teil mit tödlichem Ausgang, in Zusammenhang mit der Wetterlage (Drei allergische Katastrophenschocks bei intravenöser Anwendung von Vitamin B1),** [Dangerous conditions after vein injections, partly fatal (three allergy chocks on intravenous administration of vitamin B1)], p. 98–106.

Lossen, Heinz: **Zur Anwendung der UV-Strahlung in der ärztlichen Praxis,** [On the use of UV-radiation in medical practice], p. 107–116.

Schulze, Rudolf: **Licht und Wohnung - Strahlungsgenuss geneigter Flächen,** [Light and housing - advantage of radiation on inclined surfaces], p. 126–140.

Annales de Géophysique, Paris, Volume 9, Number 1, January/March 1953.

Rawer, K. and Argence, E.: **Considérations critiques relatives à la formation de la région E de l'ionosphère,** [Critical considerations of the formation of the ionospheric E region], p. 1–25.

Ivanoff, Alexandre: **Au sujet de la diffusion de la lumière par l'eau de mer,** [Light diffusion by sea water], p. 26–27.

Jobert, N.: **Dispersion des ondes de Rayleigh en milieu hétérogène. Application au névé du Groenland,** [Rayleigh wave scattering in heterogenous media. Application to the firn of Greenland], p. 28–32.

Rapports scientifiques des expéditions polaires Françaises, [Scientific reports of the French Polar Expeditions], p. 33.

Pluvinage, P. and Stahl, P.: **La conductibilité électrique de l'air sur l'inlandsis Groenlandais,** [Electrical conductivity of air of Greenland inland ice], p. 34–43.

Nevière, J., Bauer, Albert, Perroud, P. and Geyer, J.-P.: **Campagne au Groenland de 1948. Triangulation cotière de la région de l'Eqe,** [Greenland Expedition 1948. Coastal triangulation of the Eqe region], p. 44–84.

Imbert, Bertrand: **Sondages séismiques en Terre Adélie,** [Seismic soundings in Adélie Land], p. 85–92.

Annali di Geofisica, Rome, Volume 5, Number 4, October 1952.

Caloi, P.: **Francesco Vercelli,** p. 479.

Chapman, S.: **The morphology of geomagnetic storms: an extension of the analysis of D_s, the disturbance local-time inequality,** p. 408–500.

Medi, E.: **Una soluzione del problema della registrazione meccaniche,** [Solution of the problem of mechanical recording], p. 501–506.

Festa, C. and Santangelo, M.: **Sulla fissione spontanea dell'uranio terrestre,** [On the spontaneous fission of terrestrial uranium], p. 551–560.

Dominici, P.: **Sulla misura dell'assorbimento ionosferico,** [Measurement of ionospheric absorption], p. 561–568.

Cialdea, R. and Dominici, P.: **L'Osservatorio geofisico installato a Khartoum in occasione dell'eclisse de sole del 25-2-1952,** [Geophysical Observatory installed at Khartoum on the occasion of the eclipse of the sun, Feb. 25, 1952], p. 581–590.

Mosetti, F.: **Su una possibilità d'impiego del nefelometro,** [On the possibility of the use of a nephelometer], p. 591–596.

Santangelo, M.: **Studio della radioattività delle lave dell'Etna col metodo delle emulsioni nucleari,** [Study of radioactivity of the Etna lava flow with respect to nuclear emulsion], p. 603–612.

Associazione Geofisica Italiana. Convegno annuale per il 10–11 giugno, [Italian Geophysical Association. Annual meeting, June 10–11], p. 615–616.

Geofisica Pura e Applicata, Milan, Volume 24, 1953.

Lovera, G.: **Procedimento rapido per il calcolo del coefficiente di correlazione lineare,** [Rapid methods for calculation of the coefficient of linear correlation], p. 1–4.

Bernasconi, C.: **Proiezioni cartografiche di carattere speciale,** [Cartographic projection of special character], p. 5–10.

Berroth, A.: **Totalregistrierendes Fadenpendel für die absolute Schwerebestimmung,** [Total registration thread pendulum for absolute gravity determination], p. 11–36.

Burkhart, K.: **Die magnetische Feldmühle,** [The magnetic field mill], p. 37–53.

Burkhart, K.: **Positive und negative magnetische Baistörungen,** [Positive and negative magnetic bay disturbances], p. 54–56.
Berg, H.: **Das Rheinlandbeben dei Euskirchen vom 14. März 1951,** [The Rhineland-earthquake near Euskirchen March 14, 1951], p. 57–67.
Wegener, K.: **Die Erforschung der Atmosphäre durch die Rakete,** [The investigation of the atmosphere by rockets], p. 68–70.
Patzold, Hans-Karl: **Die vertikale Verteilung des atmosphährischen Ozons nach dem photochemischen Gleichgewicht,** [The vertical distribution of atmospheric ozone according to its photochemical equilibrium], p. 71–82.
Paetzold, Hans-Karl: **Versuch einer Analyse der gemittelten vertikalen Ozonverteilung in verschiedenen geographischen Breiten,** [Attempt at an analysis of mean vertical ozone distribution in different geographical latitudes], p. 83–94.
Israël, Hans: **Bemerkungen zum Energie-Umsatz im Gewitter,** [Notes on energy exchange in a thunderstorm], p. 95–103.
Jaeger, J. C. and Johnson, C. H.: **Note on diurnal temperature variation,** p. 104–106.
Schulze, Rudolf: **Über ein Strahlungsmessgerät mit ultrarotdurchlässiger Windschutzhaube am Meteorologischen Observatorium Hamburg,** [A radiation measuring instrument, with a windshield penetrable by infrared radiation, located at Hamburg Meteorological Observatory], p. 107–114.
Thams, J. C.: **Erfahrungen mit einem neuen Ueberzug der Lamellen des Bimetallaktinographen Fuess-Robitzsch,** [Experiences with a new coating of disks in the Fuess-Robitzsch bimetallic actinograph], p. 114–134.
Visser, S. W.: **Some remarks on the European monsoon,** p. 135–148.
Primault, B.: **Contribution à l'étude de l'influence des éléments météorologiques sur l'accroissement des forêts,** [Contribution to the study of the influence of meteorological elements on forest growth], p. 149–206.
Karapipieris, Photios P.: **Predicting minimum temperature (especially frost) by the evening wet-bulb at Blue Hill, Mass. in spring,** p. 207–213.

ournal of Atmospheric and Terrestrial Physics, London, Volume 3, Number 3, April 1953.

Paetzold, Hans-Karl: **The mean vertical ozone distribution resulting from the photochemical equilibrium, turbulence and currents of air,** p. 125–131.
Clay, J.: **Ions and condensation nuclei in the atmosphere, balance of ions and value of cosmic radiation at sea level,** p. 132–140.
Bain, W. C.: **Observations on the propagation of very long radio waves reflected obliquely from the ionosphere during a solar flare,** p. 141–152.
Lange-Hesse, Günther: **27 tägige Variation in der D-Schicht-Absorption der Ionosphäre über Singapore und Slough,** [27 day variations in the absorption of the D region of the ionosphere over Singapore and Slough], p. 153–162.
Jehn, K. H. and Staley, R. C.: **Correlations of 100 MC radio propagation with certain meteorological variables,** p. 163–171.
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